SECTION 4. TMDL - SEDIMENT LOADING ANALYSIS AND ALLOCATION

4.1 Estimates of Natural and Existing Sediment Loads for Five §303(d) Listed Watersheds

4.1.1 Introduction

An attempt to calculate sediment yield from watersheds, and delivery to streams, will provide relative rather than exact sediment yields (Harvey 2000a). The calculations presented in this section attempt to account for all significant sources of sediment separately. This approach is used to identify the primary sources of sediment in a watershed. This identification of primary sources for TMDL streams will be useful as implementation plans are designed and developed to remedy these sources.

Two sediment loading rates were calculated for selected watersheds; an estimated natural or background loading rate prior to Euroamerican settlement and land use activities within the basin, and the current sediment loading rate. The sediment loading points were calculated for five of the §303(d) watersheds (Table 4-1): Kalispell Creek, Lamb Creek, Binarch Creek, East River, and Lower West Branch Priest River. Sediment load calculations were initially chosen for these selected watersheds as part of the WBAG+ body of additional information to aid in beneficial use determinations. Sediment load information is carried further into sediment Load Allocations and Percent Reductions for the Lower West Branch and Kalispell Creek TMDLs.

Figure 4-1 presents a conceptual diagram of the relationship between the increase of a current sediment load over natural load as it relates to an impact on cold water biota (CWB) beneficial use. Current sediment load in all Priest River basin watersheds will be higher than natural conditions simply because of the timber road system. The measurements of stream biology may suggest Full Support at the estimated current sediment load, or the stream biology may suggest Not Full Support of CWB. In the latter case an

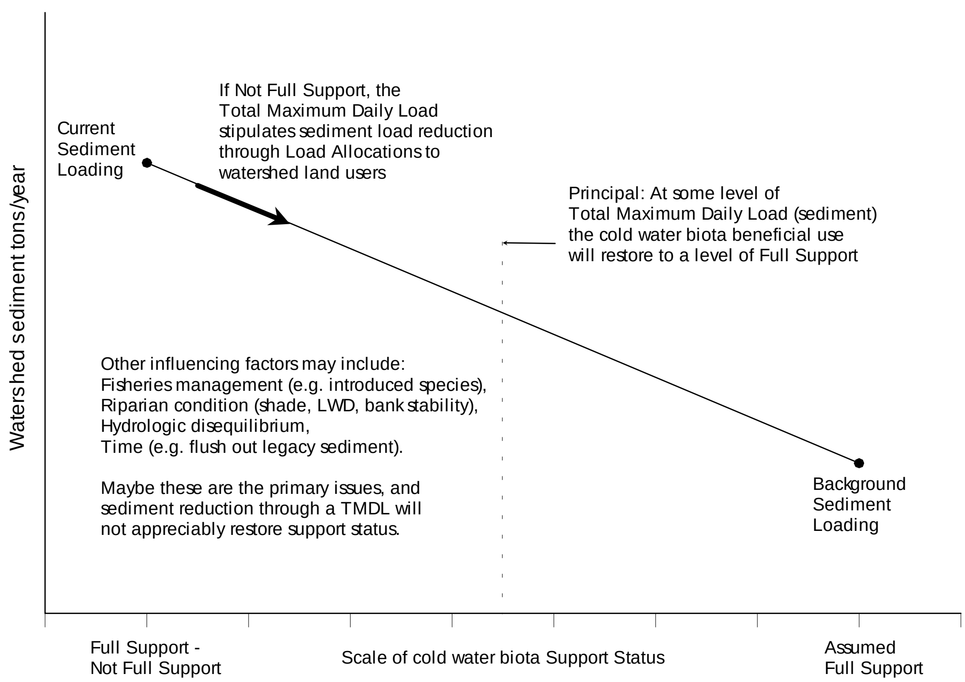

Figure 4-1. Conceptual diagram of sediment TMDL in association with cold water biota beneficial use.

Table 4-1. Sediment Load Calculations for Selected Priest River Basin Watersheds

Categories of Sediment Loading	Kalispell Creek[a]	Lamb Creek	Binarch Creek	East River[b]	Lower W. Branch	LWB w/ slides[c]
Watershed area: square miles	31.0	24.4	11.3	57.6	88.8	
Natural Sediment Load						
Tons/year – 100% delivery	**722**	**544**	**266**	**1,032**	**1,878**	**+800**
Weighted mean tons/mi^2	23.3	22.3	23.5	17.9	21.1	
WATSED routing coefficient	0.54	0.56	0.65	0.48	0.45	
Current Sediment Load						
Forested area (minus roads & crops) (mi^2)	30.0	22.4	10.8	55.3	78.3	
Tons/yr with 100% delivery	**698**	**501**	**254**	**991**	**1,649**	**+800**
Unpaved Roads						
Number of unpaved road stream crossings	41	49	19	109	220	
Mean CWE score at stream crossings	28.0	11.5	12.0	16.3	19.0	
Tons/yr from stream crossings - 100% delivery	**29**	**9**	**4**	**29**	**87**	
Miles of total road network within 200 ft of streams	14	15	7	25	49	
Miles of the total road network in the entire watershed	90	144	61	268	454	
Weighted mean CWE total road sediment score	19.8	11.5	12.0	14.2	16.8	
Tons/yr from total road network (minus crossings)	**322**	**339**	**142**	**732**	**1,489**	
Failures at roads						
Annual number of washouts at stream crossings	0.5	3	0	6	6	
Tons/yr from stream crossing washouts	**11**	**65**	**0**	**130**	**130**	
Annual number of typical road prism failures	0	4	0.5	8	8	
Tons/yr from typical road prism mass failures	**0**	**480**	**60**	**545**	**961**	
Tons/yr from atypical failures	**0**	**144**	**0**	**0**	**480**	**+800**
Hay land and Grazing						
Acres of improved hay land and pasture	190	547	0	12	4,143	
Tons/yr from hay, alfalfa and grazing improved land	**8**	**24**	**0**	**9**	**167**	
Other						
Tons/yr from residential stormwater	**0**	**4**	**0**	**0**	**0**	
Mean bank erosion in surveyed reaches (tons/mile/yr)	19	22	NA	193	45	
Extrapolated tons/yr from stream bank erosion	**225**	**164**	**NA**	**442**	**851**	
Summary						
Total current tons/yr	**1,294**	**1,731**	**460**	**2,877**	**5,816**	**+1,600**
Percent increase over natural sediment load	79%	218%	73%	179%	210%	

a = Kalispell Creek watershed calculations without Diamond Creek 6th order subwatershed
b = East River combines calculations from Middle Fork, North Fork, and the main stem
c = Mass failure slides along a 5.5 mile canyon within a lower main stem reach have been kept separate from other LWB calculations.

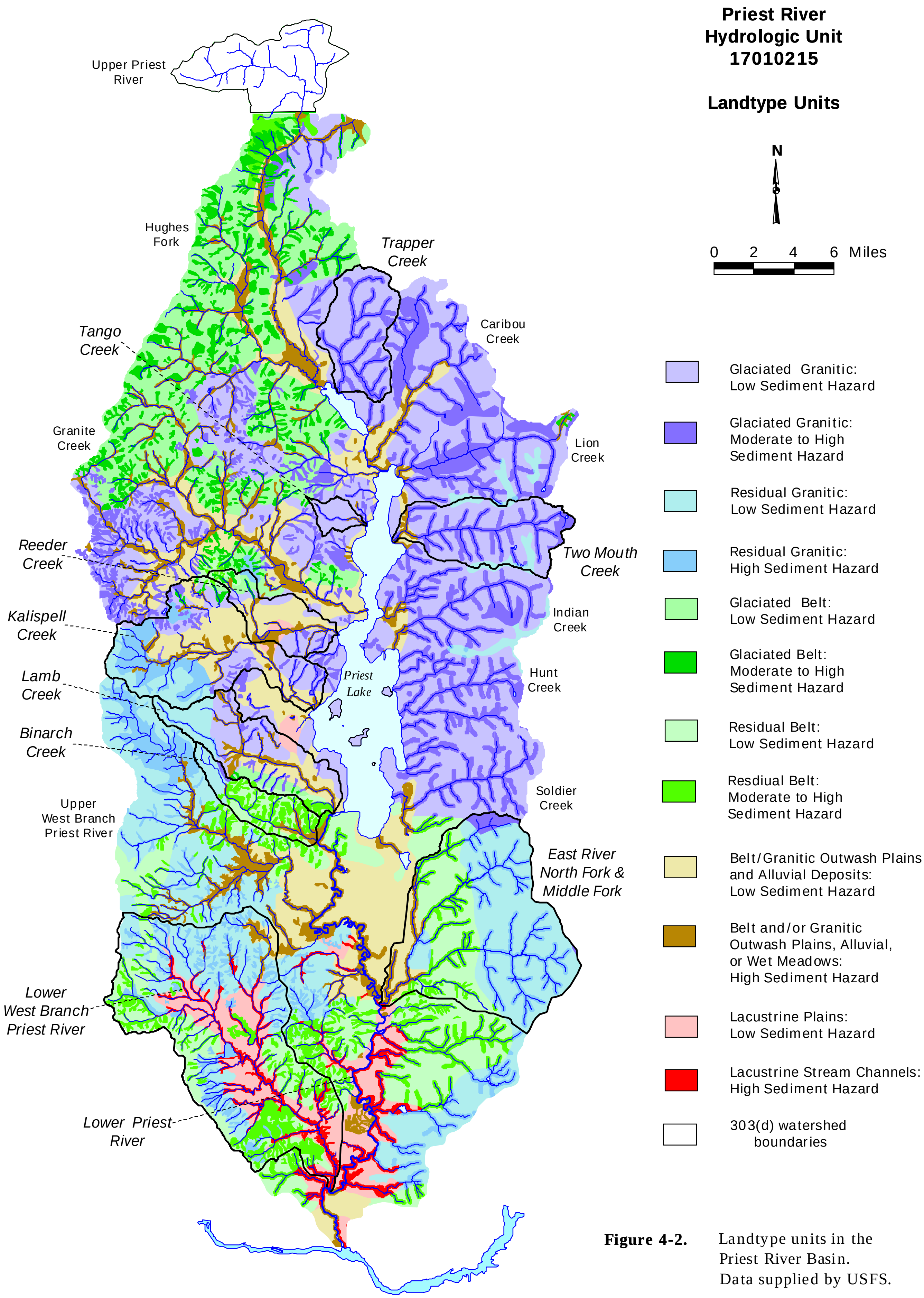

Figure 4-2. Landtype units in the Priest River Basin. Data supplied by USFS.

estimation is made as to whether the current sediment load has played a significant part in the CWB impairment. There may be other reasons for impairment such as poor instream cover and lack of quality pools associated with low, large woody debris recruitment (linked perhaps to historic riparian harvests). Other factors may be water temperature and fishery management issues such as introduction of non-native species. For a sediment TMDL, the goal is to reduce the current watershed load to a point where the CWB will exhibit full support. Questions may arise as to whether sediment load reduction in itself will lead to restoration of full support without other management actions, or if other management actions should take priority over sediment load reduction as a means to achieve full support.

4.1.2 Natural or Background Sediment Load

4.1.2.1 Forest Land

The USFS supplied to DEQ a GIS base geology and landtype map of the Priest River basin in order to calculate background sediment load (Figure 4-2, Niehoff *pers comm*). Landtypes are units of classification based on local geomorphology, hydrology, and soils characteristics. Each landtype is assigned a sediment yield in tons/square mile area/year. These yield rates are used in the Forest Service WATSED Model for planning land management activities.

A point or emphasis is made here on the use of WATSED landtype coefficients to calculate Forest Land sediment load for the Priest River TMDL. The WATSED model provides useful information to identify sources of sediment and compare management alternatives (EPA 2001). The model design was not intended to predict specific quantities of sediment yield for applications such as a TMDL. In the EPA comment package to the draft SBA and TMDL (EPA 2001), it was cited that the development origin of WATSED and related R1/R4 models was for the Idaho Batholith and that extrapolation outside of the Idaho Batholith should be made with extreme caution, and that calibration and validation does not exist for Kaniksu granitic and Belt series metamorphic geology's (USFS 1981, Ketcheson *et al*. 1999). However, the use of WATSED coefficients for sediment yield estimates from Forest Land is clearly the best of options available for TMDL development in northern Idaho, and there has been some field trials of sediment yield from various landtypes within the Idaho Panhandle National Forests (Niehoff *pers comm).*

The GIS coverage supplied by the USFS was a base map of low sediment hazard landtypes, including these examples common within the Priest River basin: Belt/Granitic Outwash Plain and Alluvial Deposits (typically gentle sloped, Bonner soils) with 11 tons/mi^2/yr; High Elevation, Residual Belt Mt. Slopes and Ridges with 13 tons/mi^2/yr; and High Elevation, Glaciated Granitic Mt. Slopes and Ridges with 23 tons/mi^2/yr (Figure 4-2). The base map was overlaid with sensitive landtypes ranging from moderate to high sediment hazard. Some common examples in the basin include: Highly Weathered, Dissected, Residual Granitic Bottoms and Toeslopes with 32 tons/mi^2/yr; Dissected, Residual Belt Mt. Slopes at 36 tons/mi^2/yr; Lacustrine Stream Channels with 41 tons/mi^2/yr; and Non-Dissected, Belt Stream Breaklands with 59 tons/mi^2/yr. Landtype units take into account historical, non-forested lands such as wet meadows.

Acreage within each watershed was partitioned to each base or sensitive landtype. Within landtype partitions the watershed acreage was further separated into ownership groups, and sub-ownership groups such as improved hay land within broader agricultural zones. The ownership and land use partitions were for the purpose of sediment yield estimates in the calculations of TMDL Load Allocations.

The WATSED sediment yield coefficients were applied to square miles of each partition resulting in tons/yr for each partition. Adding up the partitions resulted in watershed tons/yr as background sediment load. Dividing total watershed tons/yr by watershed area results in a weighted mean tons/mi^2/yr sediment yield for the watershed.

The WATSED model does not assume that sediment yield means 100% delivery to watershed streams. WATSED uses a "routing coefficient" applied to yield to reduce the estimated amount of sediment delivered to streams. The routing coefficient equation is based on watershed size. The larger the watershed the smaller the routing coefficient applied to yield, and less relative sediment delivery to streams. Table 4-1 presents a summary of sediment load for five watersheds. The first category is background sediment yield. While routing coefficients are shown, the sediment load calculations for most DEQ - TMDL documents have used the assumption of 100% delivery to streams. The Priest River basin TMDL will take the same approach.

4.1.2.2 Fire

The historic cycle of wildland fires was the prevailing disturbance in the natural setting of the basin. Estimates and records of fires between 1880 - 1940 were presented in Section 2 and 3, including large areas of western watersheds with intense multiple burns. As explored in Section 2.3.2.1 (page 55), it is felt by some USFS scientists that because of the widespread volcanic ash cap, intense multiple fires would not have led to an appreciable increase in sediment yield. Instead, a hydrophobic condition may have developed with very intense fires, and this may have led to excess water yields and flooding which caused stream channel damage. Such conditions are speculated for damage in upper reaches of Lamb Creek and Upper West Branch during the early 1900s.

4.1.2.3 Mass Failures

The basin wide IDL Cumulative Watershed Effects (CWE) analysis produced mass failure hazard ratings mostly averaging from moderate to high, based on GIS maps related to a matrix table of slope categories and predominant bedrock/parent material (Table 2-9, page 35). But, CWE mass failure scores within watershed sections observed in field surveys were generally "low", and from observations by USFS and IDL personnel the natural or historic occurrence of landslides would appear to have been minor. Due to the methods used to develop sediment coefficients for use in the WATSED model, landslides are not calculated separately. The WATSED coefficient includes landslide estimates therefore a separate landslide calculation is not needed. A separate estimate for slides would result in an overestimation of sediment load by counting landslides twice. For example, the high sediment hazard landtype Lacustrine Stream Channels at 41 tons/mi^2/yr, common along the lower channel sections of lower basin streams, reflects a layer of gravelly silt or sandy loam overlaying a clay layer, a condition with a propensity toward slides (Niehoff *pers comm)*. Another example is the moderate sediment hazard landtype Dissected, Glaciated Granitic Mt. Slopes at 39 tons/mi^2/yr, common along east side stream channels draining into Priest Lake, which in part reflects granitic soil movement on steep slopes.

One exception of having WATSED landtype coefficients alone account for natural mass failures is a 5.5 stream mile segment of Lower West Branch between Cuban Creek inflow upstream past Pine Creek inflow (Figure 3-13a and Section 3.3.A.3, page 117). Here, the canyon walls are steep, about 200 feet high, and apparently susceptible to failure related to the high sediment hazard landtype Lacustrine Stream Channels. During the stream bank erosion survey in 2000, a 1.0 mile reach was assessed within this area. Four mass failure scars were observed, at least one in recent times since a barbed wire cattle fence and steel fence post were hanging in the air at one failure scar. This large failure was estimated at 200 ft wide, 200 ft long, an average 7ft deep, and with 100% delivery to the stream the volume calculates to 10,370 cubic yards or 22,400 tons. Another large slide occurred around 1970 at Shingle Mill hill, uphill of the Peninsula Road bridge, where the slide blocked Lower West Branch and caused some local flooding and property damage (Booth *pers comm*).

It is assumed that there is a natural occurrence of mass failures along the canyon reach of Lower West Branch in part related to steep slopes and the predominate landtype. Also, a sediment deposition plug or debris dam, along with peak high flows, may concentrate stream energy toward the toe of a cliff segment, precipitating a mass failure (Janecek Cobb *pers comm*). A rough estimate of an average slide was developed at 5,560 yrd^3 or 12,000 tons with 100% stream delivery. An estimated average landslide frequency of every 15 years equates to 800 tons/yr. This value was added separately to the Lower West Branch sediment load estimates (Table 4-1) for reasons explained in the TMDL, Section 4.3.1.

4.1.3 Current Sediment Load

Summary
Several methods of calculation went into the estimates of current sediment yield to streams given various land use conditions. As a composite, these individual calculation methods might be called a model for watershed sediment load within the Priest River basin. The series of sediment calculation methods presented here are similar to those used in other northern Idaho TMDLs, including those for the Coeur d'Alene basin (Harvey 2000a and 2000b), and the Pend Oreille basin (Bergquist 2000). Areas where methods for the Priest River basin are different or modified from other northern Idaho TMDLs are noted. A summary listing of sediment sources considered and methods of yield calculations for Priest River basin are as follows:

- *Forested acres (watershed area minus roads and agricultural land*): WATSED landtype sediment yield coefficients.

- *Unpaved road stream crossings*: IDL – CWE road sediment scores at stream crossings converted to tons delivered to streams based on research in LeClerc Creek, Washington.

- *Unpaved road segments other than stream crossings*: CWE road sediment scores converted to delivered tons of sediment.

- *Road prism mass failures*: based either on USFS road maintenance experiences and observations of failures and estimated sediment yield, or based on CWE mass failure observations and estimate of sediment yield.

- *Canyon wall mass failure in Lower West Branch main stem*: based on observations and measurements during the stream bank erosion survey of 2000, and from aerial photographs.

- *Agricultural land*: Revised Universal Soil Loss Equation (RUSLE).

- *Stream bank erosion*: data from bank erosion survey converted to estimate of lateral recession rate by analysis from National Resources Conservation Service.

- *Residential stormwater*: calculation methods followed Minnesota Pollution Control Agency.

4.1.3.1 Forested Acres

From the total acreage of each watershed analyzed, acreage was subtracted for land developed as hay cropping/grazing, and the total road system prism (GIS road length determinations times width estimates of various road categories for cut slope, ditches, road surface, and fill slope). The remaining forested acreage was then given the same landtype sediment yield coefficients as natural background. Again, the calculations of Table 4-1 assume 100% delivery to streams.

Within the forested acreage are activities related to timber harvesting. Activities with a potential to increase hillslope erosion over background include: excavated skid trails and landings; tractor and cable yarding; soil compaction by heavy machinery; Cat scarification for site preparation on steep slopes; high intensity burns continuous over a large area; and damage by off-road vehicles after access afforded by canopy opening. Experience and forest practice audits have indicated that if timber harvesting follows the rules of the Idaho Forest Practices Act, or Washington Forest Practices, that forest activities do not generally result in widespread increased surface erosion (Washington Forest Practices Board 1995). One exception in the Priest River basin would be tractor excavated skid trails where the tractor blade removes the volcanic ash cap. The WATSED model incorporates a high sediment yield for a newly excavated skid trail, and the model scales down the yield for five years at which time the skid trail is assumed healed to background levels (Niehoff *pers comm*). In recent years, the USFS in their timber sale contracts have required a reduction in deep excavated skid trails.

The sediment calculation for forested acreage in Table 4-1 does not take into account the above mentioned forest activities. Thus, there is an underestimation, particularly for Non-industrial Private Timber harvests which through personal observations in the basin, will at times have inadequate BMPs. IDL - CWE inventories did examine numerous skid trails and, overall, skid trail sediment scores were rated as “low”. The acknowledged underestimation is in part offset by including the entire road network mileage in sediment yield calculations, as explained below. The problem of developing a reasonable estimate of a sediment yield coefficient for forest activities is that the degree of hillslope erosion is extremely site specific, and there is an incomplete inventory of features such as tractor excavated skid trails, particularly on private land. An attempt at developing sediment yield estimates would take considerable in-the-field assessments, which was not available for this TMDL. These in-the-field assessments should be incorporated into TMDL Implementation Plans to assure appropriate priorities for sediment reduction efforts.

4.1.3.2 Unpaved Road Surface Sediment

Forest road fine sediment loading was estimated using a relationship between CWE score and the road sediment delivered per mile of road (Figure 4-3), developed for roads on a Kaniksu granitic geology in the LeClerc Creek (Washington) watershed (McGreer *et al.* 1997). Its application to roads on Belt geology’s likely overestimates sediment yields from these systems. However, as described later, sediment loading developed from Priest River basin CWE scores may be representing an underestimation. It is important to emphasize that the CWE score given by IDL survey crews incorporates a stream delivery multiplier. The equation of Figure 4-3 predicts delivered road sediment to streams in tons/mile/yr. Other methods first predict sediment yield followed by various estimates of delivery.

The first unpaved road sediment calculation in Table 4-1 is at each stream crossing, including closed roads but excluding obliterated roads where known. For stream crossings where there was a corresponding recorded IDL - CWE score, that score was converted to tons/mile/yr by the CWE equation. This value was reduced by the fraction of 400 ft/5,280 ft, with stream crossing load calculated as 200 ft on each side of a crossing (Harvey 2000a). Again, this value is 100% delivered to streams. For stream crossings without a CWE score, the calculations used the average CWE score at crossings which were rated within each watershed.

There are other road sediment calculation methods that suggest an underestimation of load using the CWE method. The highest average CWE score at stream crossings for watersheds assessed in Table 4-1 was CWE = 28 for the Kalispell Creek watershed (which is the high end of a “low” road sediment score). This equates to 9.0 tons/mile/yr, or 0.7 tons/400 ft crossing/yr. The WATSED model uses a road surface erosion of 20,000 tons/mi^2/yr for a road 5 years or older after initial construction on weathered granitics (Niehoff *pers comm*). Using a 40 ft width typical for an active timber road prism (10 ft wide cut slope, 2 ft wide ditch, 14 ft wide road tread, and 14 ft wide fill slope), the yield per 400 ft stream crossing equals 11 tons/yr. Even using a low estimate of 25% delivery to streams within 200 ft on each side of a crossing, this value is 3 - 4 times higher than the delivery at CWE score = 28.

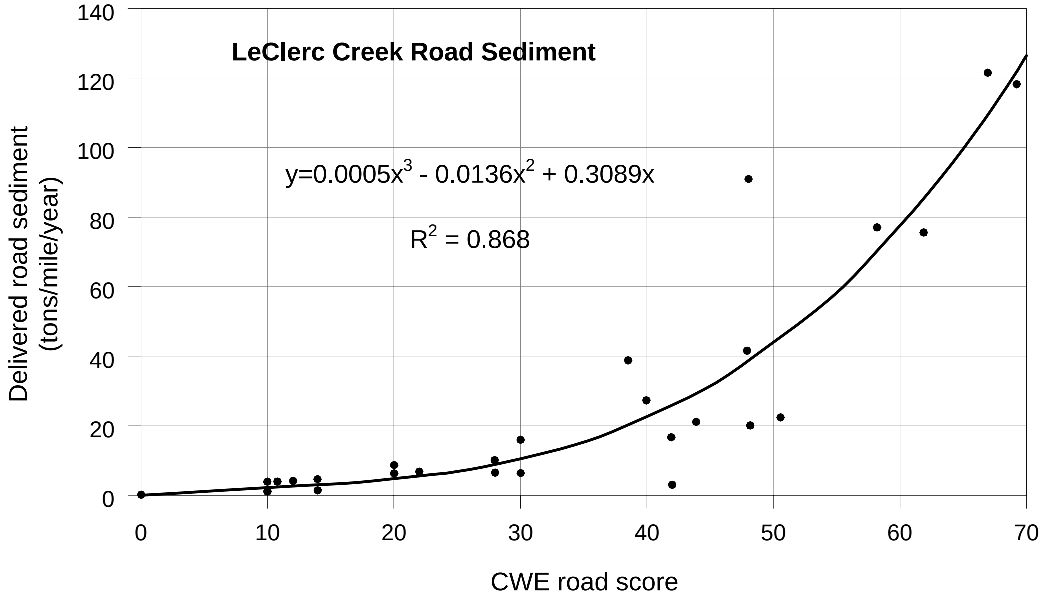

Figure 4.3 Sediment export of roads based on Cumulative Watershed Effects scores in the LeClerc Creek watershed, Washington (McGreer *et al*. 1997).

Another example comes through a worksheet presented in the Washington Forest Practices Board Manual (WFPB 1995). With road statistics of: a road older than 2 years built on course to fined-grained granite; 30% vegetative cover on cut and fill slopes; a 2" - 6" deep gravel surfacing; and moderate active secondary traffic, along with 32 inches annual precipitation; the worksheet produces 8 tons/yr at a 400 ft stream crossing. Again, assuming only 25% delivery, the yield from this example is twice the delivery of CWE score = 28.

Besides sediment delivery to streams from the road prism at stream crossings, there is delivery from roads that are in close proximity to streams. There may be significant delivery from roads that are built on steep hillslopes above and parallel to streams where culvert discharges essentially create 1st order channels down to streams without an opportunity for sediment to be trapped or settle on the forest floor. Sediment may also be delivered from roads built within the flat floodplains of a stream.

The Washington Forest Practices Board Manual (WFPB 1995) considers that roads outside of a 200 ft buffer zone from stream channels are assumed to have inconsequential sediment supply to streams because of low probability of delivery. In a study of roads constructed in coarse-grained granitic materials, equations were developed to predict downslope sediment travel distance below road fills, rock drains, and culverts (Megahan and Ketcheson 1996). Factors influencing the degree of road sediment supply to streams included: hillslope gradient, drainage design of the road, erosion volume, forest floor obstructions such as downed and embedded logs, and extent of riparian buffers along the stream coarse. An attempt at developing sediment yield estimates for roads within a 200 ft buffer using methods such as presented in the WFPB manual would take considerable in-the-field assessments, which was not available for this TMDL.

In the GIS analysis of Priest River basin §303(d) watersheds, the mileage of roads within a 200 ft buffer on each side of streams was calculated (Table 4-1). This table also includes the total mileage of roads within a watershed. Because of the underestimation of not incorporating timber harvest activities in the forested acreage sediment loading, and an apparent underestimation of CWE load at stream crossings, this TMDL uses sediment load from the entire road network. The weighted mean CWE score for all roads inventoried in a watershed was applied to total miles of active unpaved roads (excluding road segments accounted for at stream crossings). Note in Table 4-1 that the mean CWE score at road crossings were often greater then the weighted mean for the total road system. This would be expected given the CWE delivery multiplier. For closed roads, the minimum CWE score of 10 was applied to total mileage of closed roads. The vast majority of CWE inventories were on active forest roads in public land, and it is believed that in general, the single greatest factor affecting generation of fine sediment from road surfaces is the amount of traffic (WFPB 1995). For the Lower West Branch calculations, the weighted mean CWE score was adjusted upwards for application to the private unpaved road mileage based on observations of erosion problems and inadequacy of road BMPs.

4.1.3.3 Road System Failures

Based on USFS maintenance experiences over the past twelve years, road failures at stream crossings within western watersheds have been rare (Janecek Cobb *pers comm*). Instead, problems arise at the inlet end of culverts when they become plugged with debris. Culvert plugging causes ditch water to overwash onto the road creating gulleys and rills as the wash goes down gradient, and then down onto the fill. Sediment delivery caused by a plugged culvert, or damaged culvert, was estimated at an average 10 cubic yards per event. An average number of plugged culvert events per year for each western watershed was assigned based on the USFS maintenance experiences (Table 4-1). To obtain sediment weight/yr, volume per event was multiplied by a density of 2.16 tons/yrd^3 (1.5 gr/cc, a silt-loam density recommended by USFS as an average representation of Priest River basin soils). Delivery to streams was assumed at 100%. For the East River drainage, failures at stream crossings were based on IDL - CWE recorded observations of Significant Management Problems and failures at crossings. Although the CWE inventories only cover a portion of the road network in a watershed, the number of failures were not prorated to the entire network, because when doing so gives unrealistic numbers based on IDL maintenance experiences.

To account for road prism failures other than at stream crossings, USFS maintenance experiences were again used. An average typical failure was figured as 30 ft wide by 40 ft long by 5 ft deep and 25% delivery to a stream. This calculates to 56 yrd^3. Average number of failures per year were given for the western watersheds (Table 4-1), and volume was multiplied by 2.16 tons/yrd^3. For the East River drainage, yearly loading from failures were strictly based on IDL - CWE recorded observations and estimates of cubic yards delivered to streams. For the Middle Fork CWE inventory, there were 5 failures recorded for an estimated delivery to streams of 391 tons (per year). For the North Fork there were 3 failures recorded for an estimated 154 tons. The East River CWE data was not prorated to the entire road network because of the uncertainty of the age of each failure (i.e. 5 observed failures does not necessarily equate to 5 failures/yr), and number of observed failures was close to IDL maintenance experiences within an average year.

There are occasional atypical large mass failures from the road system, often associated with high runoff years (such as in the spring of 1997). A few examples include: a failure on Bear Paw Road in 1997 near the Ole Creek crossing where an estimated 8,890 yrd^3 slumped, and about 25% of that volume was near the immediate vicinity of the crossing; a failure in Lamb Creek of an estimated 1,670 yrd^3 with 40% delivery to the stream; and in the Granite Creek watershed, a 1997 landslide above Athol Creek of an estimated 2,445 yrd^3, washing out portions of 3 roads, and with an estimated 50% delivery to Athol Creek. Sediment loading for atypical large mass failures along roads, with an average occurrence of one per ten years, was assigned to Lamb Creek and Lower West Branch (Table 4-1).

4.1.3.4 Canyon Wall Mass Failures in Lower West Branch

Section 4.1.2.3 described large slumps at canyon walls directly into the Lower West Branch main stem along a 5.5 mile lower reach stream course. One measured landslide was around 10,400 yrd^3 with 100% delivery. These slides are likely in part a natural phenomenon and have been assigned an average annual natural sediment load of 800 tons/yr (estimated average slide mass divided by a 15 year occurrence). At least one mass failure within the canyon (in 1993) can be directly attributed to a private clear-cut timber harvest on a steep slope followed by a thunderstorm and subsequent slide. Perhaps some slides have been related to hill cuts for construction of road segments, although road density within the canyon boundaries is low. Possibly sediment plugs or debris dams leading to bank toe undercut at peak flows, and subsequent hillslope failure, are related to upstream land use activities. It is extremely uncertain as to the ratio and degree of failures that are natural compared to slides relating to land use activity. Thus, an estimated annual sediment load due to both natural and landuse activities has been assigned 1,600 tons/yr (Table 4-1). This is double the loading from natural slides in the watershed.

4.1.3.5 Agricultural Land Sediment Yield

Sediment yield was estimated for lands with hay and alfalfa crops, and grazing, where it is assumed that there is periodic vegetation improvement by tilling and reseeding. Sediment yield was estimated using the Revised Universal Soil Loss Equation (RUSLE). Stream bank erosion, gully erosion, or scour is not taken into account by RUSLE. The range of coefficients that were used in RUSLE, as listed in the equation description below, were selected with the aid of the Idaho Soil Conservation Commission (Hogan *pers comm*).

RUSLE is: $A = RK(LS)CD$

A= average annual soil loss from sheet and rill erosion caused by rainfall and associated overland flow in tons/acre/year.

R= Erosivity Factor. NEZPERCE Req is recommended for northern Idaho, and was used in this analysis, where Req=140 which aligns with 24-25 inch precipitation.

K= Soil Erodibility Factor. This is a measure of the susceptibility of soil particle detachment by water. A value of $K = 0.49$ representing Bonner soil was used for Kalispell Creek, Lamb Creek, and main stem East River; and $K = 0.45$ for Lower West Branch as an estimate for a mixture of Selle and Mission soils which seem typical of the Lacustrine Plains landtype.

LS= Slope Length/Slope Steepness Factor. An LS factor of 0.32 was consistently assigned based on a maximum 550 ft slope length and an average 2% slope for crop land in the western watersheds.

C= Cover-Management Factor. This represents the effects of plants, soil cover, soil biomass, and soil disturbing activities on erosion. A consistent value of $C = 0.002$ was used based on a ten-year pasture/hay rotation and intense harvesting/grazing for worst case scenario.

P= Support Practices Factor. These practices may include contouring, strip cropping, and terraces. A value of $P = 1$ was consistently used indicating no support practices in place.

Acres of crop land and sediment yield to streams is presented in Table 4-1. For most RUSLE calculations in the basin watersheds, sediment yield was around 0.04 tons/acre/year.

4.1.3.6 Encroaching Roads and Stream Bank Erosion

Sediment yield calculations in the Coeur d'Alene Basin have taken into account the effect of encroaching roads (roads within 50 ft of a stream) on erosion either at the road bed, or within the stream banks and stream bed (Harvey 2000a). The effect of an encroaching road is that it can interfere with the stream's natural tendency to seek a steady state gradient. During high discharge periods, the constrained stream may erode at the road bed or fillslope, or if the road is sufficiently armored, the confined stream energy may erode the stream banks and the stream bed. As explored in Section 3, the only appreciable length of encroaching forest road (excluding stream crossings) within the §303(d) listed watersheds is a 0.9 mile stretch of Forest Road 308 along a low gradient middle reach of Kalispell Creek. Since the stream bank erosion survey included a portion of Kalispell Creek adjacent to the encroaching road, it seems preferable to include the encroaching road effect as part of the stream bank erosion results obtained in the survey.

Under a Memorandum of Understanding between DEQ, the Kootenai-Shoshone Soil Conservation District, Idaho Soil Conservation Commission, and USDA Natural Resources Conservation Service (NRCS), a trained summer crew conducted stream bank erosion surveys within many watersheds of the Coeur d'Alene and Priest River basins during the summer of 2000. The crew used a GPS unit to map location of the subsample stream segments surveyed, and to store stream bank condition scores and measurements in the GPS data dictionary. Soil samples were also obtained for laboratory analysis. Length of stream reaches surveyed ranged from 0.3 - 1.7 miles, and average reach length was around 1 mile. Most streams surveyed had two inventories, within a lower and middle reach. Within the Priest River basin, all surveys were within gradual gradient segments, less than 1.5% slope. Often, the surveys were through adjacent hay crop and grazing lands, but many reaches were through forested land.

The NRCS methodology of analyzing the data and producing a stream bank erosion sediment yield in tons/stream mile/year relies on the survey measurements of: 1) eroding bank length and eroding bank height, 2) six bank condition factors that are scored and compiled into a single index leading to an estimate of lateral recession rate (LRR) in inches/yr, and 3) soil type and soil particle size. A stream section with evidence of a current eroding condition is rated as having either one bank or both as eroding. Stream lengths with both banks in a good, stable condition without signs of erosion, are considered as having zero sediment yield.

A preliminary data analysis by NRCS has been made available for this final TMDL document (Sampson *pers comm*). The average erosion rate within segments surveyed ranged from 15 tons/stream mile/yr to 193 tons/stream mile/yr (detailed for each listed watershed in Section 3). The assigned error rate is a confidence interval of 60%. The erosion rates from surveyed segments were extrapolated to adjacent low gradient reaches as long as the difference in slope between surveyed segment and unsurvyed reach was not greater than 1%. Low gradient B channel sections that are within the valley depositional reaches were included. Stream bank erosion yields presented in Table 4-1 reflect estimates for low gradient main stem reaches only, and do not include any estimates for feeding tributaries. In addition, there has been no attempt to include bank erosion within the natural or background sediment load estimates. For East River, bank erosion rates were only available for the 2.5 mile main stem reach. Lastly, while estimated erosion rates are presented in tons/year, the rates supplied are meant to represent long-term (20 year+) averages, since erosion at a single site may come in one or two above normal flow events over that long-term average (Sampson *pers comm*).

Stream bank eroding condition may be reflecting a combination of several factors, including: the effect of encroaching roads; hydrologic disequilibrium in part due to accelerated peak flow; stream channel aggradation by sediment buildup and subsequent channel widening; loss of vegetation stability due to historic riparian harvest of conifers; constriction and then increase of stream energy at improperly sized culverts and bridges; and stream bank damage and loss of riparian vegetation by grazing cattle and horses. It is mostly very difficult to partition out these causes expect in a few places where local effects such as undersized crossings or cattle access has clearly resulted in damage.

4.1.3.7 Residential Stormwater Runoff

The only watershed where sediment laden stormwater runoff from a residential/commercial area was taken into consideration was lower Lamb Creek. The lower 4 miles of Lamb Creek winds it way through a rural residential/commercial zone where there is some agricultural activity and surrounding forest. Within the residential/commercial zone there is ever increasing semi-impervious and impervious area of unpaved roads, parking lots, driveways, subdivisions, and residential/commercial buildings. There are new excavations each spring through fall (including a nine-hole addition to the golf course), and there have been some observations of clearing riparian vegetation down to the stream banks. The Lamb Creek residential area is mostly flat terrain with permeable soils which mitigates some of the effect of stormwater runoff.

An estimate of fine sediment loading into Lamb Creek from the 311 acres of residential area was made using methods from the Minnesota Pollution Control Agency (1989). The calculation method is in part based on annual precipitation; a runoff coefficient based on estimated impervious and semi-impervious area; and an increase of Total Suspended Sediment in Lamb Creek attributed to the area as measured upstream and downstream. One multiple site sampling run was conducted in Lamb Creek during spring runoff in 1995 (Rothrock and Mosier 1997). Just upstream of the Lamb Creek rural residential area the TSS concentration was 26 mg/L, and downstream at the mouth, 46 mg/L. This 20 mg/L TSS gain cannot exclusively be attributed to the residential area. A rough estimate of the annual sediment load from the residential area was 4 tons/yr, insignificant compared to other sediment source values. The observed TSS gain within the water column, though, does represent a significant increase within the lower 4 mile reach.

4.2 Load Capacity and Instream Water Quality Targets

4.2.1 TMDL Authority

Section 303(d)(1) of the Clean Water Act requires states to prepare a list of waters not meeting state water quality standards in spite of technology based pollution control efforts. The prescribed remedy for these water quality limited waters is for states to determine the total maximum daily load (TMDL) for pollutants "...at a level necessary to implement applicable water quality standards with seasonal variations and a margin of safety." A margin of safety is included to account for any lack of knowledge about how limiting the pollutant loads will attain the desired water quality.

Section 303(d)(2) requires that both the §303(d) list and any TMDLs developed by the state, be submitted to the Environmental Protection Agency (EPA). The EPA is given thirty days to either approve or disapprove the state's submission. If the EPA disapproves, EPA has another thirty days to develop a list or TMDL for the state. Both the list and TMDLs, either approved or developed by EPA, are incorporated into the state's continuing planning process as required by section 303(e).

4.2.2 Loading Capacity in Relation to Appropriate Measurements of Beneficial Use Full Support

Referring back to the conceptual diagram of a sediment TMDL in Figure 4-1, a Loading Capacity is the calculated annual watershed sediment load that sets a level capable of fully supporting the beneficial uses. The load capacity for a TMDL, designed to address a sediment caused limitation to water quality, is complicated by the fact that the State's water quality standard is a narrative rather than a quantitative standard. Within the watersheds of the Priest River basin, the sediment interfering with the cold water biota and salmonid spawning beneficial uses is primarily fines from silt to large grained sand. Adequate quantitative measurements of the effect of excess sediment have not been developed. Given this difficulty, a sediment loading capacity for the TMDL is more difficult to develop. The sediment loading capacity for TMDLs in the Priest River basin would be based the following premises:

- natural background levels of sedimentation are assumed to be fully supportive of the beneficial uses cold water biota and salmonid spawning.

- the stream system has some finite yet unquantified ability to process (transport) a sedimentation rate greater than background rates.

- the beneficial uses (cold water biota and salmonid spawning) instream, will respond to a level of full support, which can be quantified when the finite yet unquantified ability of the stream system to process sediment is met.

- care must be taken to control factors which may interfere (fish harvest) with the quantification of beneficial use support.

The loading capacity rate at which Full Support is exhibited has been set at various levels within TMDL documents developed by DEQ. These have ranged from setting an interim loading capacity at the background level for some watersheds in the Coeur d'Alene Lake subbasin (Harvey 2000a) and the Pend Oreille basin (Bergquist 2000); to 50% above background for the North Fork Coeur d'Alene River (Harvey 2000b); and to 100% above background in the draft Priest River SBA and TMDL (Rothrock 2000). It was emphasized in the draft Priest River report that a 100% above background loading capacity was exclusively based on the methods of sediment yield and delivery presented in Section 4.1. Determined loading capacities within DEQ have been set with some varying approaches and assumptions when calculating sediment loads. In guidelines presented by the Washington Forest Practices Board (1995), watershed sediment delivery that has increased by 50% - 100% above background level is considered to have a small, but chronically detectable effect. If the increase in sediment load is more than 100%, than this will likely lead to an exceedance of water quality standards. As expected, the Washington guidelines express caution in interpreting the sediment load calculations.

An interim loading capacity set at background level is not to say that efforts at reducing current sediment load will reach background levels (in most watersheds this would be an impossibility). This instead reflects that the loading capacity over the background level which will allow full support of cold water biota is very uncertian or not known. By setting an interim loading capacity at background reflects the premise or assumption listed above that background levels allowed full support.

The concept of a TMDL is to work backward (Figure 4-1). If the current sediment load, which is an inexact estimate, is believed to be a cause for cold water biota impairment, begin reducing the current sediment load, and with continued monitoring of the stream environment, an identified or quantified recovery of full support condition will signal the loading capacity. There can certainly come a point when sediment reduction will reach its feasible and economical limits, and that may come at a point prior to the loading capacity and full support condition being reached. And, there certainly is the possibility that other factors within the stream such as instream cover, quality of pools, and stream temperature, may play a significant enough role that cold water biota may not exhibit full support with sediment reduction alone.

In their comment package to the draft Priest River SBA and TMDL, EPA opposed the recommended loading capacity of 100% above background sediment load (EPA 2001). EPA's primary concern was that the inherent errors of the sediment yield methods used for the Priest River basin were likely very high, and that the load estimate methods were without validation. Given the level of error, EPA's recommended approach is to set the target of the TMDL at the natural or background level of sediment production.

DEQ disagrees with the concept of establishing an interim load capacity at background level (Essig *pers comm*). This discounts the known fact that human land use activities which result in increased sediment delivery to streams can be at a level in which cold water biota and salmonid spawning beneficial uses continue to exhibit Full Support and water quality standards are met.

For Priest River basin it is instructive to revisit the estimated sediment loading of Section 4.1 and compare with the potential measurements of beneficial use support. The items below are appropriate measures of full support for cold water biota and salmonid spawning established for watersheds in the Coeur d'Alene basin (Harvey 2000a and 2000b):

- macroinvertebrate biotic index (MBI) score of 3.5 or greater.

- total trout density at minimum reference levels of 0.1 - 0.2 fish/m^2/hr electro-fishing effort; which is approximately equivalent in Priest River basin electro-fishing surveys to a range of 5 - 10 total trout/100 m^2.

- three or more salmonid age classes including juveniles (<100 mm).

- presence of sculpins.

The vast majority of MBIs in the Priest River basin are greater than 3.5, and it has been determined that this measure alone is not indicative of support status in the basin. A good example is Lower West Branch where four MBI scores ranged from 3.6 – 4.3, but fish statistics and habitat evaluations clearly indicated Not Full Support. Exceptions of meeting the MBI criteria have been Kalispell Creek (MBI <3.5 in 1995 BURP, but >3.5 in 1997 BURP), and Lamb Creek (MBI >3.5 in 1995 BURP, but <3.5 in 1997 BURP).

The target, minimum total salmonid density is placed into the units of fish/m^2/hr effort since this value can be calculated with BURP protocol, and it has been the target measurement stated in Coeur d'Alene basin TMDLs. The reason this unit of measurement was not used in Section 2 and 3 of the Priest River report is that electro-fishing surveys from various agencies were being compared, and effort in seconds shocked were not always available or reported. Also, some of the data compared was from snorkeling.

For salmonid spawning beneficial use, it is presumed that in all mid western streams draining into Priest Lake, and all streams draining into Lower Priest River, that there is self-propagating populations of brook trout, and in some cases cutthroat trout. In some electro-fishing surveys there simply were too few of a particular salmonid species captured to meet the WBAG criteria of salmonid spawning Full Support (for example Binarch Creek). If population numbers increased in response to a reduction in watershed sedimentation, the salmonid spawning criteria would likely be met.

Presence of native sculpins has been used in the Coeur d'Alene basin as a partial indicator of whether there is excess sedimentation (Harvey 2000a and 2000b). In general, sculpins are believed to prefer cool or cold flowing water and presence of cobble-riffle habitats. Sculpin populations may be rare or absent from fine-grained substrates (silt) or highly embedded cobble substrates (IDEQ 2001). As shown in Table 4-2 for lower Lamb Creek, which has a high sand component, sculpins were very abundant.

For the northern §303(d) listed streams, Trapper Creek and Two Mouth Creek, the timber road network with stream crossings, and timber harvesting activities would result in an estimated minimum 50% sediment load above background. These streams clearly meet the DEQ criteria of Full Support. These two watersheds, however, do not provide a good comparison for mid western and lower basin streams for reasons including: a history of restricted fishing regulations; a parent geology almost exclusively granitic; and channel types which are predominately steep A channel and moderately steep B channel.

Table 4-2 presents BURP electro-fishing data and current watershed sediment loading results for the mid and lower basin watersheds examined in this Section. East River is presented as Middle Fork and North Fork separately and does not include the East River main stem.

For the Middle Fork East River, agreement has been established between DEQ and EPA for a Full Support status call. While the total salmonid criteria at the lower and middle 1997 BURP sites are below the target 0.1 total trout/m^2/hr effort, IDFG sampling in 1986 showed total salmonid densities greater than 10 fish/100 m^2, and IDL electro-fishing in upper Middle Fork (1998) exhibited a mean density of 12 cutthroat/100 m^2. Also, there were good densities of sculpin in the BURP sampling, and the three

MBIs were greater than 4.0. For this watershed, current annual sediment load has been calculated as 145% above background. The North Fork East River, which is determined as Full Support in this SBA, has a calculated sediment load of 128% above background. Current sediment load calculations for both the Middle and North Forks did not include a stream bank erosion component as bank surveys were not conducted in these streams. Utilizing the Middle and North Forks for comparisons with other lower basin streams meets the requirement of a mixture of parent geology and landtypes similar to other watersheds; but overall channel type is steeper with far less depositional low gradient channel than other streams.

Full Support status is also assigned to Lamb Creek (just south of Kalispell Creek with similar watershed characteristics) using good brook trout and sculpin densities, and an average MBI > 3.5. Current sediment load in the Lamb Creek watershed is calculated at 218% over background.

Kalispell Creek and Binarch Creek have been assigned a Not Full Support status based primarily on low total salmonid densities, and yet the calculated sediment loads are only 79% and 73% above background, respectively. EPA referred to this data set as one reason why 100% loading capacity is not supportable (EPA 2001). While the errors of sediment load calculations are large and acknowledged, there is little doubt when examining the land use statistics between Middle Fork East River (clearly Full Support), and that of Kalispell Creek (apparently Not Full Support), that the sediment yield would be substantially less in Kalispell Creek. This may point to other mitigating factors in Kalispell Creek such as elevated water temperature, excessive sand from legacy fire and land use that has not worked through the stream system, and/or other habit issues such as poor instream cover and poor pool quality related to insufficient large woody debris. This also likely reflects that the relationship between sediment loading and cold water biota impairment is site specific at the level of 5th or 6th order watershed.

In conclusion, the target loading capacity for the Kalispell Creek and Lower West Branch TMDLs are set at 50% above background level. This is considered a reasonable or conservative target for Full Support attainment because of determined FS status for Middle Fork and North Fork East River, and Lamb Creek, which range from 128% - 218% current sediment load above background. It is also considered that the 50% loading capacity incorporates a minimum 50% margin of safety and does not warrant an additional 10% margin of safety reduction common in TMDL calculations.

Table 4-2. Current Sediment Loading of Selected §303(d) Watersheds in Relation to Salmonid and Sculpin Population Data: Fish Data is Exclusively from BURP Electro-fishing

§303(d) Listed Stream Segments	Increase of current sediment load over background sediment load	BURP electro-fishing year and reach	Total salmonid density (fish/m^2/hr effort)	3 salmonid age classes/WBAG spawning criteria support status	Sculpin density (fish/m2/hr effort)
Kalispell Creek	79%	2000 Lower 2000 Middle	0.02 0.07	Yes/FS No/FS	0.15 0.02
Lamb Creek	218%	2000 Lower 2000 Middle	0.44 0.77	Yes/FS Yes/FS	0.68 0
Binarch Creek	73%	2000 L-Middle	0.06	No/NFS	0
Lower West Branch	210% w/o canyon slides	2000 Lower 2000 Middle	0.01 0.06	No/NFS No/NFS	0.004 0.14
Middle Fork East River	145%	1997 Lower 1997 Middle	0.08 0.05	Yes/FS Yes/FS	0.44 0.25
North Fork East River	128%	1998 Lower	0.23	No/FS	0.08

4.3 Total Maximum Daily Loads for Water Quality Limited Waterbodies of the Priest River Basin

4.3.1 Lower West Branch Priest River

4.3.1.1 Introduction

Based on the information presented in Section 3.3.A, the Lower West Branch main stem for at least the middle and lower reaches are judged as Not Full Support of cold water biota and salmonid spawning beneficial uses. Water quality impairment is due in part to excess sediment, and current sediment loads contribute to this condition.

4.3.1.2 Segments Addressed and Points of TMDL Compliance

The stream segment that is addressed and must be monitored for TMDL compliance of Idaho Water Quality Standards (i.e. Full Support of cold water biota and salmonid spawning beneficial uses), is the main stem Lower West Branch from the Idaho – Washington border downstream to the mouth (Figure 3-13a). This low gradient segment is around 18 miles in length, and represents 80% of the total main stem length (excluding the steep A channel headwaters). Attainment of Full Support within this Idaho segment will require sediment reduction efforts throughout the watershed including lands within the state of Washington. There have been two DEQ BURP sites with electro-fishing data within the Idaho segment (Figure 3-13a), and these are logical future monitoring areas for evaluating compliance. Two other upstream BURP sites were on the main stem, in Washington. DEQ did not electro-fish there. The upper low gradient reach and steeper headwaters of the Lower West Branch, in Washington, are not within jurisdiction of Idaho Standards. This upper segment would have to be addressed by the Washington Department of Ecology. It is recommended that monitoring sites within the upper reach be established by Washington DOE and/or the USFS.

It is considered that data from the two BURP sites in Idaho, within the 4th order main stem, do not represent, or make a statement about, the water quality status of the numerous 1st to 3rd order tributaries to the main stem, or the steep headwaters of Lower West Branch. These tributary streams remain as Not Assessed. Tributaries such as Bear Paw Creek and Flat Creek are entirely within the state of Washington.

4.3.1.3 Appropriate Measurements of Full Beneficial Use Support

Sediment load reduction from the current level towards the interim sediment reduction goal is expected to attain an, as yet unquantified, sediment load at which the cold water biota and salmonid spawning beneficial uses will attain full support. The sediment load will be recognized by the appropriate measures of Full Support under the DEQ assessment guidance and process applicable at the time of the future assessment. The draft guidance under review at the time of this writing (WBAGII) utilizes a stream index scoring system from BURP sampling metrics comprised of a Stream Macroinvertebrate Index, Stream Fish Index, and Stream Habitat Index. Under the current guidance of WBAG+ and additional considerations, the appropriate measures of Full Support are:

- continuation of MBI scores of 3.5 or greater throughout the main stem,
- a total salmonid density at the minimum target levels of 0.1 - 0.2 fish/m^2/hr electro-fishing effort (approximately 5 – 10 fish/100 m^2),
- three or more salmonid age classes including juveniles (<100 mm),

- increased presence of sculpins below Torrelle Falls with a minimum target level of 0.1 sculpins/m^2/hr effort; and continuation of present sculpin density above Torrelle Falls,

- as established by a Watershed Advisory Group (WAG), appropriate instream targets for surrogate habitat characteristics such as percent fines and residual pool volume, and

- in addition to the biological measures above, the TMDL Implementation Plan may address fisheries management objectives regarding native cutthroat trout. Below Torrelle Falls there may be an objective to obtain adequate spawning gravels for fluvial cutthroat trout migrating up from Lower Priest River. Above the falls, there may be an objective of habitat improvement related to recovery of resident cutthroat trout. If interagency decisions and agreements are made to attempt an improvement of the cutthroat trout population, then monitoring for the effect of sediment reduction efforts should also include measurements of habitat parameters that are related to sedimentation.

4.3.1.4 Loading Capacity

A loading capacity of 50% increase above natural background level as established in Section 4.2 seems appropriate for this watershed, again based exclusively on the methods of sediment load calculations described in Section 4.1. The estimated background sediment delivery from the Lower West Branch watershed is calculated at 1,878 tons/yr (Table 4-3). The interim sediment TMDL goal is set at 50% above background, or 2,818 tons/yr.

The calculations of loading capacity and sediment load allocation (Section 4.3.1.7) treat separately the canyon wall mass failures into the main stem along the 5.5 stream mile reach from Cuban Creek inflow upstream past Pine Creek inflow (Section 4.1.2.3). This sediment source is kept separate from the other sediment sources in the TMDL Tables because of: 1) the high uncertainty of occurrence related to human land use activities versus natural landslides, 2) the high uncertainty of an average landslide mass and frequency of occurrence, and 3) because the estimated average slide of 12,000 tons occurring every 15 years, or 800 tons/yr, is sufficiently high to mask or dilute calculations from other determined sediment sources such as the unpaved road network (Table 4-3). A value of 800 tons/yr has been assigned to the natural sediment load for Lower West Branch (Table 4-1), and applying a 50% loading capacity above background equates to 1,200 tons/yr.

Critical Conditions are to be considered as part of the analysis of loading capacity. The beneficial uses in this watershed are impaired due to chronic sediment conditions, as such this TMDL deals with yearly sediment loads. The concept of critical conditions is difficult to reconcile with this type of impact. The critical condition concept assumes that under certain conditions, chronic pollution problems become acute pollution problems and therefore we need to ensure that the acute conditions do not occur. The proposed reductions in the TMDL will reduce the chronic sediment load and also reduce the likelihood that an acute sediment loading condition will exist. It is in this way that we have accounted for critical conditions in the TMDL.

4.3.1.5 Margin of Safety

As previously discussed in Section 4.2.2, a loading capacity of 50% above background is considered a sufficiently conservative target such that an additional margin of safety reduction is not warranted.

Table 4-3. Sediment Calculations for Lower West Branch Watershed by Ownership/Management Categories[a]

Categories of Sediment Loading	USFS	Private Idaho	Private WA	Timber Industry	Idaho State	County Roads	Totals
Natural Sediment Load							
Watershed area: square miles	66.7	15.4	3.0	2.3	1.1	0.3	88.8
Weighted mean tons/mi^2	20.8	22.5	19.3	23.8	22.8	21.8	21.1
Tons/year – 100% delivery	**1,387**	**347**	**57**	**54**	**26**	**6**	**1,878**
Current Sediment Load							
1. Forested area							
Forested area minus roads & crops (mi^2)	63.9	8.7	2.3	2.2	1.1	0.0	78.3
Weighted mean tons/mi^2	20.8	22.5	19.3	23.8	22.8	21.8	21.1
Tons/yr with 100% delivery	**1,330**	**196**	**45**	**52**	**25**	**0**	**1,649**
2. Unpaved roads							
Mean tons/stream crossing from CWE score	0.39	0.39	0.34	0.20	0	0.52	0.40
Number of stream crossings	141	48	3	5	0	23	220
Tons/yr at stream crossings	**54**	**19**	**1**	**1**	**0**	**12**	**87**
Miles of total roads - (minus stream crossings)	318	63	16	8	3	31	439
Mean tons/mile of total roads from CWE score	3.1	3.9	4.0	2.9	3.1	3.5	3.4
Tons/yr from total roads (minus crossings)	**1,017**	**256**	**65**	**26**	**8**	**117**	**1,489**
3. Failures at roads							
Number of washouts at stream crossings	3	2	0	0	0	1	6
Tons/yr from stream crossing washouts	**65**	**43**	**0**	**0**	**0**	**22**	**130**
Number of typical road prism failures	6	2	0	0	0	0	8
Tons/yr from typical road prism mass failures	**721**	**240**	**0**	**0**	**0**	**0**	**961**
% assigned to tons/yr atypical mass failure	75%	15%	0	0	0	10%	100%
Tons/yr from atypical failures	**360**	**72**	**0**	**0**	**0**	**48**	**480**
4. Hay land and grazing							
Acres of improved hay land and pasture	0	3,838	305	0	0	0	4,143
Tons/yr from agricultural improved land	**0**	**155**	**12**	**0**	**0**	**0**	**167**
5. Stream bank erosion							
% assigned to tons/yr stream bank erosion	75.2%	17.6%	3.4%	2.6%	1.3%	0%	100%
Tons/yr from stream bank erosion	**639**	**150**	**29**	**22**	**11**	**0**	**851**
Total current tons/yr	**4,186**	**1,131**	**152**	**101**	**46**	**199**	**5,816**
Percent of total	72.0%	19.4%	2.6%	1.7%	0.8%	3.4%	100%

a = Sediment load table does not include 800 tons/yr assigned to both natural and current loads from lower canyon mass failures (see Table 4-1 and Section 4.3.1.4)

4.3.1.6 Seasonality

Unlike pollutants discharged from point sources or soluble in the water column, sediment is generally transported on the rising limb of the annual discharge event(s). As a local example in the Priest River basin, monitoring at Kalispell Creek mouth during the Priest Lake baseline study (Rothrock and Mosier 1997), produced an annual load of 391 tons total suspended sediment (TSS) for water year 1995. The months of March - May produced 93% of the annual load with the peak in April at 40%. In recent times, major discharge events with corresponding sediment yield, delivery, and transport events, occurred in 1974 and 1997. Sediment loading capacities are most reasonably described in yearly increments, even though this quantification may be artificial.

4.3.1.6 Sediment Waste Load Allocation

There are no discrete or point source discharges of pollutants to Lower West Branch. No waste load allocation is necessary to address discrete sources.

4.3.1.7 Sediment Load Allocation

Load allocations are made to six ownership/management categories within the Lower West Branch watershed (Table 4-4). Bonner County maintained roads was added to the allocation list because of the contribution to current sediment loading from county roads. Acres of county roads were subtracted from the various ownership's in which the roads pass through.

The load allocations are based on the natural sedimentation yield from the GIS analysis of partitioning ownership/management acres into landtype categories. The calculated tons/yr were based on the landtype sediment yield coefficients in tons/mi^2/yr. Natural sediment yields were then increased by 50% for loading capacity, which incorporates a margin of safety. Note that sediment allocations in percent come close to

Table 4-4. Percentage of the Lower West Branch Watershed Owned and/or Managed by Various Entities, and the Sediment Load Allocated to each Ownership/Management

Ownership/ Management	Acres	Percent of Ownership/ Mgmt acres	Sediment Allocation (tons/yr)	Percent of sediment allocation	Percent of stream miles in canyon[a]	Slide Sediment allocation (tons/yr)
USFS	42,685	75.1	2,081	73.9	3.6	--
Industrial Timber Lands, ID & WA	1,459	2.6	81	2.9	--	--
Private Forest and Agricultural Lands, WA	1,907	3.4	86	3.1	--	--
Private Forest and Agricultural Lands, ID	9,875	17.4	521	18.5	67.3	--
Idaho State	724	1.3	39	1.4	29.1	--
Bonner County Maintained Roads	186	0.3	10	0.3	--	--
Totals	56,835	100%	2,818	100%	100%	1,200

a = Mass failure into 5.5 stream miles from canyon walls: Cuban Creek inflow upstream past Pine Creek inflow.

ownership/management percentages (Table 4-4). The sediment load allocation for canyon wall mass failures is 1,200 tons/yr, but this was not allocated among the ownership/management groups. While the percent of stream miles within each ownership through the canyon reach is calculated and shown, an equitable and workable sediment allocation and reduction scheme is best decided among stakeholders during development of the TMDL Implementation Plan.

4.3.1.8 Sediment Load Reduction Allocation

The current sediment load calculations for each ownership/management entity, and the yearly reduction required to meet the sediment allocations, are summarized in Table 4-5. A couple of the load reduction results do not correspond well with ownership/management percentages. While Bonner Count maintained roads encompass only 0.3% of the total land area, load reduction is 6.3% of the total. This land area however has been converted to a 100% road system, and thus received 100% of the road system sediment calculations. Also, county road stream crossings comprise 10.5% of the total crossings, 7% of the total road network, and 10% of the active road network. Several stream crossing segments on Bear Paw Creek Road were given road sediment CWE scores higher than the basin average. The road was inventoried during the fall when ditch scraping procedures were being conducted. The CWE inventory was during a period of fall rains, and fine sediment delivery to streams was observed from some of the ditches, and thus reflected in the CWE scores.

In their comment package to the draft Priest River SBA and TMDL, Bonner County (2001) remarked on the discrepancy of 0.3% land under county maintenance versus the calculated sediment load reduction. One comment regarded the higher CWE scores at some stream crossings due to fall ditch cleaning. The sediment load calculation presented here would assume an annual increased load due to this activity. But the county stated that while ditches were cleaned the last two consecutive years, this was part of a road building project and generally the ditches are cleaned when necessary or about every 5 – 10 years. This author has observed cleaning activities on Bear Paw Creek Road somewhat more frequent than this interval. Applying the same average CWE score to county road crossings as USFS active timber road crossings (Table 4-3), reduces the county load by 3 tons/yr.

Table 4-5. Sediment Load Reductions Required to meet TMDL Goals for the Lower West Branch

Ownership/Management	Sediment Allocation (tons/yr)	Calculated current sediment load (tons/yr)	Sediment reduction required in tons/yr	Percent of sediment reduction
USFS	2,081	4,186	2,105	70.2
Industrial Timber Lands, ID & WA	81	101	20	0.7
Private Forest and Agricultural Lands, WA	86	152	66	2.2
Private Forest and Agricultural Lands, ID	521	1,131	610	20.4
Idaho State	39	46	8	0.3
Bonner County Maintained Roads	10	199	189	6.3
Totals	2,818	5,816	2,998	100%
Canyon wall mass failures	1,200	1,600	400	--

An emphatic point stated by the county is that, "not only does everyone that uses the private, USFS or state lands benefit from the use of the county roadways, those roadways are only there to serve those stakeholders" (Bonner County 2001). The County has requested a more equitable distribution of sediment load reduction and perhaps financial assistance in their reduction efforts. During the development phase of the TMDL Implementation Plan, with fine-tuning of the load calculations and establishing sediment reduction priorities and projects, it is recommended that the concerns of the County be addressed.

Private forest and agricultural lands in Idaho also have a higher percent reduction than ownership percentage. This reflects that private lands had: the only added component of sediment from hay cropping; a road stream crossing number that was 22% of the total; and some higher CWE road sediment scores based on observations of inadequate BMPs. The load calculations for Idaho private land did have some sediment allocations for stream crossing washouts and road prism failures, based primarily on extrapolating the USFS maintenance experiences on Forest roads to private roads based on mileage percentages. This allocation was based on very little on-the-ground observations. On the other hand, it is considered that the load calculations are underestimating sediment load from non-industrial private timber harvesting, and this underestimation is supported by several observations of private timber harvests with inadequate BMPs.

The sediment load reduction for canyon wall mass failures is given simply as a total and not allocated among the ownership/management categories. While each ownership that encompasses the canyon lands can adopt timber harvest and new construction BMPs that may help prevent landslides, there may also be a portion of landslide occurrence that is related to upstream land use activities on various ownership's which alter such factors as peak flow intensity.

4.3.1.9 Monitoring Provisions

Instream monitoring of cold water biota and salmonid spawning beneficial use status, during and after implementation of sediment abatement projects, is key to establish the final sediment load reduction required by the TMDL. Instream monitoring, which will detect the threshold values identified in section 4.3.1.3, should be completed a minimum of every five years at randomly selected upper to lower sites within the main stem low gradient channel. Baseline data is available at four DEQ BURP sites, so these would be logical monitoring sites. Following the current BURP protocol, monitoring should assess a stream reach length that is at least 40 times bankfull width, and include sampling for macroinvertebrates, and electro-fishing. Monitoring data collected should be BURP compatible so that the DEQ Water Body Assessment Guidance, Second Edition (WBAGII), can be used to evaluate beneficial use support. Surrogate targets established in the TMDL Implementation Plan by the WAG, such as percent fines and residual pool volume, will also be monitored in a manner determined in the plan.

4.3.1.10 Pollution Control Strategies

Given the varied ownerships and management jurisdictions within the Lower West Branch watershed, a meaningful implementation of sediment reduction will require a high level of cooperation among ownership/management entities, as well as an agreed upon mutual goal toward water quality improvement. It is thus recommended that prior to development of a TMDL Implementation Plan, a local Watershed Advisory Group (WAG) be formed, comprised of stakeholder representatives.

The USFS should continue its efforts at identifying road segments where either reconstruction of active roads or obliteration of closed roads could most lead to sediment load reduction (high probability of sediment delivery to streams). For example, where stream crossings are no longer needed the crossings should be decommissioned to remove culverts, and prepare the stream bed and road approach for stabilization and permeable for water infiltration. The amount of sediment reduction achieved by TMDL implementation measures needs to be tracked and documented on a yearly basis.

On private agricultural lands there are several programs such as the USDA Conservation Reserve Program which provides cost share opportunities to cattle ranchers for fencing off stream segments to cattle, develop off-site water sources, and to plant riparian vegetation along denuded stream banks. Where feasible, programs such as the federal Wetland Reserve Program (WRP) provides grant funding for easements where low gradient stream courses are allowed to restore wetland functions such as meander, floodplains, and riparian vegetation. The WRP also includes funding for eliminating cross drain ditches.

Timber harvesting on non-industrial private lands needs to adhere to the Idaho Forest Practices Act (FPA). This requires both a willingness and awareness by private logging interests to ensure protection of streams from sedimentation, and an effort by IDL to monitor FPA compliance and enact enforcement when there are FPA violations. Within the slopes of the lower reach canyon walls, Site Specific BMPs for timber harvesting practices need to be set to account for the high risk of landslides.

For private roads, driveways, and stream crossings there would need to be additional expenses by landowners to ensure that: water runoff management measures are adequate; and that stream crossings have proper sized culverts and stabilization of the road prism around the crossing. These additional expenses would have to result from a willingness and awareness of private landowners to afford protection of streams from sedimentation. Bonner County roads are well maintained and most have a good gravel base. But the county needs to explore alternatives to their ditch scraping methods and placement of excavated dirt, and ditches draining into streams could use further structural measures for sediment trapping.

4.3.1.11 Additional Improvements not Directly Related to Sediment Delivery

The low salmonid densities measured in Lower West Branch are not solely the result of sediment delivery to the watershed streams. There also appears to be poor quality habitat features not directly linked to sediment. A TMDL allocation and implementation plan must address the pollutant of concern, which in this case is sediment. It will not address many habitat related factors. A more holistic approach is necessary to recover fish density in the Lower West Branch.

Habitat surveys by IDFG, DEQ, and USFS have noted a lack of good instream cover and quality pools created by large woody debris (LWD). In part this may relate to historic timber harvesting activities where conifers were removed from the riparian zone at a level not now allowed under the Idaho FPA. While walking many stream sections of Lower West Branch, large stumps of cedar and other conifer species can be found within the floodplain. These harvesting practices thus reduced the recruitment of LWD to the stream. Perhaps also, LWD within the stream channel was deliberately removed because of LWD interference with flood flow. Such removal historically occurred within the stream system of the North Fork Coeur d'Alene River (Harvey 2000b). Besides providing cover and creating pools for fish habitat, stream LWD also serves to create a series of sediment traps, thus metering the movement of larger sized sediment within the stream.

There are several methods used by fish biologists to artificially establish LWD within stream channels as fish habitat enhancements. Such projects should be explored in the TMDL Implementation Plan.
Efforts toward riparian plantings, from shrubs to conifers depending on site conditions, has already been mentioned as a goal on grazing lands under such programs as the USDA Conservation Reserve Program. The initial purpose is stream bank stabilization where banks have been damaged and are eroding due to large animal access. Efforts at increasing riparian shrub and conifer density also serves to: create better buffer strips to intercept and settle sediment delivered from uplands; creates more shade to attenuate water temperature increases during summer; and in the very long-term, reestablishes a recruitment source of LWD.

There has been much discussion in Sections 2 and 3 of this report regarding population dominance of the introduced brook trout and decline of native cutthroat trout and bull trout. In a rhetorical question asked by the USFS in their comment package to the draft SBA, it was stated, "if one goal for a TMDL is to reduce sediment loading, what beneficial use are we attempting to improve? Are we trying to improve the habitat for brook trout?" (USFS 2000b). In the context of DEQ interpretation and application of Idaho Standards regarding total salmonid density as an indicator of cold water biota beneficial use, the answer is yes. The Priest Lake Watershed Advisory Group has also expressed a similar opinion regarding Lamb Creek. While it might be preferential to have a thriving native cutthroat trout fishery in that stream, recovery attempts are outside the purview of a TMDL, particularly with no guarantee of recovery success. The WAG felt it was satisfactory to have a productive, fishable population of the resident salmonid, in this case brook trout.

The last item of Section 4.3.1.3 does however, recommend that development of the TMDL Implementation Plan, as guided by a local WAG, consider a fisheries management approach with an objective of enhancing cutthroat trout populations. This will certainly require an interagency approach, and agreement among the local area stakeholders.

4.3.1.12 Feedback Provisions

Data from which the Subbasin Assessment and TMDL for the Lower West Branch were developed, are often from insufficient measurements and crude sediment load calculations. As more exact measurements are obtained during implementation plan development and subsequent to its development, this will be added to a revised TMDL as required.

When the appropriate measurements of cold water biota and salmonid spawning beneficial uses meet the full support attainment level, further sediment load reducing activities will not be required in the watershed. The interim sediment loading capacity will be replaced in a revised TMDL with the ambient sediment load. Best Management Practices for forest and agricultural activities, along with residential road construction and maintenance, will be prescribed by the revised TMDL. Regular monitoring of the beneficial uses will be continued for an appropriate period to establish maintenance of full support.

4.3 Total Maximum Daily Loads for Water Quality Limited Waterbodies of the Priest River Basin

4.3.2 Kalispell Creek

4.3.2.1 Introduction

Based on the information presented in Section 3.3.B, the Kalispell Creek main stem, from just upstream of the confluence of Hungry Creek downstream to the mouth (Figure 3-15a), is judged as Not Full Support of cold water biota beneficial use. This stream segment is 12 miles in length and mostly low gradient channel type. Salmonid spawning beneficial use within this segment is considered as Full Support. Water quality impairment is due in part to excess sediment, and current sediment load may be contributing to this condition.

As discussed in Section 3.3.B, boundaries of the Kalispell Creek watershed for the purpose of a sediment TMDL does not consider the northern 6th order subwatershed of Diamond Creek and other small streams that drain toward the Potholes Research Natural Area (Figure 3-15b). The resulting size of the Kalispell Creek watershed for TMDL consideration is 19,844 acres.

4.3.2.2 Segments Addressed and Points of TMDL Compliance

The stream segment that is addressed and must be monitored for TMDL compliance of Idaho Water Quality Standards (i.e. Full Support of cold water biota beneficial use), is main stem Kalispell Creek from the Idaho – Washington border downstream to the mouth. This segment is 8.3 miles in length, and represents around 70% of the total main stem length that is labeled as water quality impaired. Attainment of Full Support within this Idaho segment will require sediment reduction efforts throughout the watershed including lands within the state of Washington. There have been four DEQ BURP sites, two with electro-fishing surveys, within the Idaho segment (Figure 3-15a). These sites are logical future monitoring areas for evaluating compliance. One other BURP site was on the upper main stem, in Washington. DEQ did not electro-fish there, but USFS has electro-fished upper main stem sites. The middle to upper main stem to Hungry Creek confluence, and the steeper headwaters of Kalispell Creek, in Washington, are not within jurisdiction of Idaho Standards. This segment would have to be addressed by the Washington Department of Ecology. It is recommended that monitoring sites in this reach be established by Washington DOE and/or the USFS.

It is considered that data from the four BURP sites in Idaho, within the 3rd order main stem, do not represent, or make a statement about, the water quality status of the numerous 1st and 2nd order tributaries to the main stem, including the steep headwaters of Kalispell Creek. These tributary streams remain as Not Assessed. All tributaries that feed into the middle to upper segment of Kalispell Creek are entirely within the state of Washington.

4.3.2.3 Appropriate Measurements of Full Beneficial Use Support

Sediment load reduction from the current level towards the interim sediment reduction goal is expected to attain an, as yet unquantified, sediment load at which the cold water biota beneficial use will attain full support. The sediment load will be recognized by the appropriate measures of Full Support under the DEQ assessment guidance and process applicable at the time of the future assessment. The draft guidance under review at the time of this writing (WBAGII) utilizes a stream index scoring system from BURP sampling metrics comprised of a Stream Macroinvertebrate Index, Stream Fish Index, and Stream Habitat Index. Under the current guidance of WBAG+ and additional considerations, the appropriate measures of Full Support are:

- MBI scores of 3.5 or greater throughout the main stem,

- a total salmonid density at the minimum target levels of 0.1 - 0.2 fish/m^2/hr electro-fishing effort (approximately 5 – 10 fish/100 m^2),

- continuation of three or more salmonid age classes including juveniles (<100 mm),

- continued presence of sculpins with a minimum target level around 0.1 sculpins/m^2/hr effort,

- as established by a Watershed Advisory Group (WAG), appropriate instream targets for surrogate habitat characteristics such as percent fines and residual pool volume, and

- in addition to the biological measures above, the TMDL Implementation Plan may address fisheries management objectives regarding native resident cutthroat trout and possibly spawning of Priest Lake adfluvial cutthroat trout. If interagency decisions and agreements are made to attempt an improvement of the cutthroat trout population, then monitoring for the effect of sediment reduction efforts should also include measurements of habitat parameters that are related to sedimentation.

4.3.2.4 Loading Capacity

A loading capacity of 50% increase above natural background level as established in Section 4.2 seems appropriate for this watershed, again based exclusively on the methods of sediment load calculations described in Section 4.1. The estimated background sediment delivery from the Kalispell Creek watershed is calculated at 722 tons/yr (Table 4-6). The interim sediment TMDL goal is set at 50% above background, or 1,084 tons/yr.

Critical Conditions are to be considered as part of the analysis of loading capacity. The beneficial uses in this watershed are impaired due to chronic sediment conditions, as such this TMDL deals with yearly sediment loads. The concept of critical conditions is difficult to reconcile with this type of impact. The critical condition concept assumes that under certain conditions, chronic pollution problems become acute pollution problems and therefore we need to ensure that the acute conditions do not occur. The proposed reductions in the TMDL will reduce the chronic sediment load and also reduce the likelihood that an acute sediment loading condition will exist. It is in this way that we have accounted for critical conditions in the TMDL.

4.3.2.5 Margin of Safety

As previously discussed in Section 4.2.2, a loading capacity of 50% above background is considered a sufficiently conservative target such that an additional margin of safety reduction is not warranted.

4.3.2.6 Seasonality

Unlike pollutants discharged from point sources or soluble in the water column, sediment is generally transported on the rising limb of the annual discharge event(s). As a local example in the Priest River basin, monitoring at Kalispell Creek mouth during the Priest Lake baseline study (Rothrock and Mosier 1997), produced an annual load of 391 tons total suspended sediment (TSS) for water year 95. The months of March - May produced 93% of the annual load with the peak in April at 40%. In recent times, major discharge events with corresponding sediment yield, delivery, and transport events, occurred in 1974 and 1997. Sediment loading capacities are most reasonably described in yearly increments, even though this quantification may be artificial.

Table 4-6. Sediment Calculations for Kalispell Creek by Ownership Categories

Categories of Sediment Loading	USFS	Private Idaho	Timber Industry	Totals
Natural Sediment Load				
Watershed area: square miles	28.9	1.6	0.5	31.0
Weighted mean tons/mi^2	23.3	22.9	24.3	23.3
Tons/year – 100% delivery	**674**	**36**	**12**	**722**
Current Sediment Load				
1. Forested area				
Forested area minus roads & crops (mi^2)	28.2	1.2	0.5	30.0
Weighted mean tons/mi^2	23.3	22.9	24.3	23.3
Tons/yr with 100% delivery	**658**	**27**	**13**	**698**
2. Unpaved roads				
Mean tons/stream crossing from CWE score	0.72	0.68	NA	0.71
Number of stream crossings	36	5	0	41
Tons/yr at stream crossings	**25.9**	**3.4**	**0**	**29**
Miles of total roads - (minus stream crossings)	76	8	2	87
Mean tons/mile of total roads from CWE score	3.7	4.7	2.2	3.7
Tons/yr from total roads (minus crossings)	**280**	**38**	**5**	**322**
3. Failures at roads				
Number of washouts at stream crossings	0.5	0	0	0.5
Tons/yr from stream crossing washouts	**11**	**0**	**0**	**11**
Number of typical road prism failures	0	0	0	0
Tons/yr from typical road prism mass failures	**0**	**0**	**0**	**0**
% assigned to tons/yr atypical mass failure	NA	NA	NA	NA
Tons/yr from atypical failures	**0**	**0**	**0**	**0**
4. Hay land and grazing				
Acres of improved hay land and pasture	0	190	0	190
Tons/yr from agricultural improved land	**0**	**8**	**0**	**8**
5. Stream bank erosion				
% assigned to tons/yr stream bank erosion	90%	10%	0%	100%
Tons/yr from stream bank erosion	**202**	**23**	**0**	**225**
Total current tons/yr	**1,177**	**99**	**18**	**1,294**
Percent of total	90.9%	7.6%	1.4%	100%

Table 4-7. Percentage of the Kalispell Creek Watershed Owned and/or Managed by Various Entities, and the Sediment Load Allocated to each Ownership/Management

Ownership/Management	Acres	Percent of ownership/ management acres	Sediment Allocation (tons/yr)	Percent of sediment allocation
USFS	18,476	93.1	1,011	93.3
Private Forest, Agricultural and Residential Lands, ID	1,003	5.1	54	5.0
Industrial Timber Lands, ID & WA	365	1.8	19	1.7
Totals	19,844	100%	1,084	100%

4.3.2.6 Sediment Waste Load Allocation

There are no discrete or point source discharges of pollutants to Kalispell Creek. No waste load allocation is necessary to address discrete sources.

4.3.2.7 Sediment Load Allocation

Load allocations are made to three ownership/management categories within the Kalispell Creek watershed (Table 4-7). The load allocations are based on the natural sedimentation yield from the GIS analysis of partitioning ownership/management acres into landtype categories. The calculated tons/yr were based on the landtype sediment yield coefficients in tons/mi^2/yr. Natural sediment yields were then increased by 50% for loading capacity which incorporates a margin of safety. Note that sediment allocations in percent come close to ownership/management percentages (Table 4-7).

4.3.2.8 Sediment Load Reduction Allocation

The current sediment load calculations for each ownership/management entity, and the yearly sediment reduction required to meet the sediment allocations, are summarized in Table 4-8. The calculated load reduction for private forest, agricultural, and residential lands (not including timber industry lands), does not correspond well with the ownership percentage. While this category encompasses only 5.1% of the total land area, load reduction is 21.3% of the total. A part of this discrepancy relates to the road statistics where unpaved private road mileage accounts for 9% of the total road miles, and number of stream crossings is 10% of the total. Around 80% of the private road mileage is within the residential area surrounding the mouth of Kalispell Creek (Figure 3-15c). There have been some observed problems noted with ditches and culverts in this area, and there has been observance of sediment laden stormwater runoff from the unpaved roads and driveways into the stream. On the other hand, some runoff from within the drawn boundary of this area probably does not flow into the stream, but instead into Priest Lake.

Another reason for the load reduction discrepancy on private land relates to sediment assigned from stream bank erosion. Ten percent of the annual stream bank erosion from 12 miles of gradual gradient Kalispell Creek was assigned to the private land category. Of these 12 stream miles, 22% flows through private property. An assignment of stream bank erosion to private lands was meant to account for activities such as cattle access to the stream, and some loss of wetlands – wet meadows function associated with land conversion to hay cropping and grazing. However, an assignment of stream bank erosion to private land

Table 4-8. Sediment Load Reductions Required to meet TMDL Goals for Kalispell Creek

Ownership/Management	Sediment Allocation (tons/yr)	Calculated Current sediment load (tons/yr)	Sediment Reduction required in tons/yr	Percent of sediment reduction
USFS	1,011	1,177	165	78.7
Private Forest, Agricultural and Residential Lands, ID	54	99	45	21.3
Industrial Timber Lands, ID & WA	19	18	0	0
Totals	1,084	1,294	210	100%

does not have any quantitative bases. It is uncertain to what degree the current channel condition reflects hydrologic disequilibrium associated with historic and current land use activities on public and private lands. During the development phase of the TMDL Implementation Plan, with fine-tuning of the load calculations and establishing sediment reduction priorities and projects, it is recommended that the sediment load reduction allocated to private lands be reexamined.

4.3.2.9 Monitoring Provisions

Instream monitoring of cold water biota and salmonid spawning beneficial use status, during and after implementation of sediment abatement projects, is key to establish the final sediment load reduction required by the TMDL. Instream monitoring, which will detect the threshold values identified in section 4.3.2.3, should be completed a minimum of every five years at randomly selected upper to lower sites within the main stem low gradient channel. Baseline data is available at five DEQ BURP sites, so these would be logical monitoring areas. Following the current BURP protocol, monitoring should assess a stream reach length that is at least 40 times bankfull width, and include sampling for macroinvertebrates, and electro-fishing. Monitoring data collected should be BURP compatible so that the DEQ Water Body Assessment Guidance, Second Edition (WBAGII), can be used to evaluate beneficial use support. Surrogate targets established in the TMDL Implementation Plan by the WAG, such as percent fines and residual pool volume, will also be monitored in a manner determined in the plan.

4.3.2.10 Pollution Control Strategies

Unlike the situation in Lower West Branch, ownership and management jurisdictions within the Kalispell Creek watershed is much less varied with 93% of the land under USFS management. The existing Priest Lake Watershed Advisory Group (WAG) could serve as the local TMDL advisory group. There would however, need to be representation and input from the residential community within the watershed.

In their comment package to the draft Subbasin Assessment, USFS stated that there has been extensive surveys of the streams, road networks and timbered units, and with a few exceptions, identified sediment sources have been addressed (USFS 2000b). One road impact is Forest Road 308 (Kalispell Creek Road) which travels up the valley floor of the middle segment of Kalispell Creek, west of Hwy 57 (Figure 3-15c). Of the 4 miles that parallel the main stem, 3.3 miles are within a 200 ft zone from the stream, and 0.9 miles of this is within the 50 ft encroaching zone. Historically this road was the rail route for salvage logging. Road 308 is a well traveled and maintained transportation road with a surface of compacted aggregate. Undoubtedly there is sediment produced from the road surface, cut banks, and ditches delivered to the stream. The IDL – CWE inventory identified a 1 mile section of Road 308, as it turns northward in the headwaters of Kalispell Creek, as having moderate sediment delivery scores along with two Significant Management Problems (Figure 3-15c). Perhaps more importantly, the road constricts the stream and reduces the effective floodplain and riparian area of the reach.

USFS was considering obliteration of Road 308 that parallels the stream and relocating it along a more northerly route, as identified in a preliminary timber regeneration/watershed restoration draft EIS (USFS 1998c). Planning for this project was put on hold due to preparation of the Douglas-fir beetle project EIS, and administration of timber sales related to beetle mortality in lower western watersheds of the basin. It would seem that the draft plans associated with obliteration and relocation of Forest Road 308 would remain as a top priority for TMDL sediment reduction efforts.

Regarding agriculture land, there is a current effort underway led by the IDFG, to establish the 1,200 acre Bismark Meadows under a federal Wetland Reserve Program (WRP). Land owner signatures have been obtained for WRP easement purchases. This effort is still in a preliminary stage with grant funding not secured, but if a WRP is established this will help restore wetland functions to a small section of Kalispell Creek at the southern end of Bismark Meadows.

Timber harvesting on non-industrial private lands needs to adhere to the Idaho Forest Practices Act (FPA). This requires both a willingness and awareness by private logging interests to ensure protection of streams from sedimentation, and an effort by IDL to monitor FPA compliance and enact enforcement when there are FPA violations.

For private roads, driveways, and stream crossings there would need to be additional expenses by landowners to ensure that: water runoff management measures are adequate; and that stream crossings have proper sized culverts and stabilization of the road prism around the crossing. These additional expenses would have to result from a willingness and awareness of private landowners to afford protection of streams from sedimentation.

4.3.2.11 Additional Improvements not Directly Related to Sediment Delivery

Low salmonid densities measured in Kalispell Creek are not solely the result of current sediment delivery to watershed streams. Current sediment load may not even be the major related cause. There also appears to be many poor to mediocre fish habitat features not directly linked to current sediment load. For example, residual pool volume is often considered insufficient related to a thick sand bedload, and this sandy substrate may be related more to legacy issues than current land use (as well as the parent granitic geology). A TMDL allocation and implementation plan must address the pollutant of concern, which in this case is current sediment load. It will not address some of the other habitat related factors. A more holistic approach is necessary to recover fish density in Kalispell Creek, and such an approach was being planned during the preliminary draft of the Kalispell timber regeneration/watershed restoration EIS (USFS 1998c).

Habitat surveys by DEQ and USFS have noted a lack of good instream cover and quality pools created by large woody debris (LWD). In part this may relate to historic timber harvesting activities where conifers were removed from the riparian zone at a level not now allowed under the Idaho FPA. While walking many stream sections of Kalispell Creek, large stumps of cedar and other conifer species can be found within the floodplain. These harvesting practices thus reduced the recruitment of LWD to the stream. There was also a loss of riparian LWD to fires and salvage logging.

There are several methods used by fish biologists to artificially establish LWD within stream channels as fish habitat enhancements. Such projects should be explored in the TMDL Implementation Plan. It should be noted however, that in the past USFS personnel have created pools with placement of LWD, and some of these pools subsequently became nearly filled with moving sand bedload.

There has been much discussion in Sections 2 and 3 of this report regarding population dominance of the introduced brook trout and decline of native cutthroat trout and bull trout. In a rhetorical question asked by the USFS in their comment package to the draft SBA, it was stated, "if one goal for a TMDL is to reduce sediment loading, what beneficial use are we attempting to improve? Are we trying to improve the habitat for brook trout?" (USFS 2000b). In the context of DEQ interpretation and application of Idaho Standards regarding total salmonid density as an indicator of cold water biota beneficial use, the answer is yes. The Priest Lake WAG has also expressed a similar opinion regarding Lamb Creek. While it might be preferential to have a thriving native cutthroat trout fishery in that stream, recovery attempts are outside the purview of a TMDL, particularly with no guarantee of recovery success. The WAG felt it was satisfactory to have a productive, fishable population of the resident salmonid, in this case brook trout.

In section 3.3.B.1 it was mentioned that in 1960 IDFG conducted Rotenone treatments within large segments of the Kalispell Creek main stem and tributaries. IDFG subsequently planted 135,000 cutthroat fry. There seems to be no other follow-up documentation on fish management efforts in the stream, but current electro-fishing results clearly show a brook trout dominance with few cutthroats captured within the main stem

The last item of Section 4.3.2.3 does however, recommend that development of the TMDL Implementation Plan, as guided by the WAG, consider a fisheries management approach with an objective of enhancing resident cutthroat trout populations. This will certainly require an interagency approach, and agreement among the local area stakeholders. Current fish population surveys do show some decent resident cutthroat densities within the tributaries Bath Creek and Hungry Creek, and a few cutthroat are sampled within the main stem. Because of the situation noted for adfluvial cutthroat and bull trout within Priest Lake in Section 2, it may be unrealistic to expect Kalispell Creek to once again become a spawning ground for these large adfluvial natives.

4.3.2.12 Feedback Provisions

Data from which the Subbasin Assessment and TMDL for Kalispell Creek were developed are often from insufficient measurements and crude sediment load calculations. As more exact measurements are obtained during implementation plan development and subsequent to its development, this will be added to a revised TMDL as required.

When the appropriate measurements of cold water biota beneficial use meet the full support attainment level, further sediment load reducing activities will not be required in the watershed. The interim sediment loading capacity will be replaced in a revised TMDL with the ambient sediment load. Best Management Practices for forest and agricultural activities, along with residential road construction and maintenance, will be prescribed by the revised TMDL. Regular monitoring of the beneficial uses will be continued for an appropriate period to establish maintenance of full support.

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APPENDIX A

Priest River Basin:
History of Listings in DEQ Idaho Water Quality Status Reports –
§305(b) and §303(d) Lists

Table A-1. Trapper Creek

ID-17010215-17	**Trapper Creek**	upstream limit**: headwaters**
	PNRS: **1432.00**	downstream limit: **Upper Priest Lake**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**	This water body is: **Unclassified**	Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**No**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no** cause:	assessment info: **not assessed in 1988**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988							

1992 §305(b) and §303(d) Information

§303(d) listed: **no** cause:	assessment info: **not assessed in 1992**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992							

1994 §305(b) and §303(d) Information

§303(d) listed: **yes** cause: **sediment, habitat alteration**	assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from SSOC designation, "supported/threatened" for CWB and SS**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes** cause: **sediment, habitat alteration**	assessment info**: no water bodies assessed in 1996. 303(d) listing resulted from SSOC designation, "supported/threatened" for CWB and SS**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-2. Two Mouth Creek

ID-17010215-12	**Two Mouth Creek**	upstream limit**: headwaters**
	PNRS: **1427.00**	downstream limit: **Priest Lake**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**

This water body is: **Unclassified**

Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **DEQ Coeur d'Alene Regional Office - evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988			**Supported/ threatened**		**Supported/ threatened**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix A	**Partial Support**		**Partial Support**		**Partial Support**	**Supported/ threatened**	**Supported/ threatened**

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment, habitat alteration**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from SSOC designation, "supported/threatened" for CWB and SS**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment, habitat alteration**

assessment info**: no water bodies assessed in 1996. 303(d) listing resulted from SSOC designation, "supported/threatened" for CWB and SS**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-3. Tango Creek

ID-17010215-21	**Tango Creek**	upstream limit**: headwaters**
	PNRS: **1428.00**	downstream limit: **Priest Lake**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**	This water body is: **Unclassified**	Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **DEQ Coeur d'Alene Regional Office - evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988			**Supported/ threatened**		**Partial Support**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix D			**Supported/ threatened**		**Partial Support**		

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **nutrients, sediment**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **nutrients, sediment**

assessment info**: no water bodies assessed in 1996. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-4. Kalispell Creek

ID-17010215-24	**Kalispell Creek**	upstream limit**: headwaters**
	PNRS: **1421.00**	downstream limit: **Priest Lake**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**	This water body is: **Unclassified**	Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **DEQ Coeur d'Alene Regional Office - evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988			**Supported/ threatened**		**Supported/ threatened**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **not assessed in 1992**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992							

1994 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info**: no water bodies assessed in 1994.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment**

assessment info**: no water bodies assessed in 1996. 303(d) listing resulted from Idaho Panhandle National Forest analysis.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-5. Lamb Creek

ID-17010215-25 | **Lamb Creek** | upstream limit**: headwaters**

PNRS: **1419.00** | downstream limit: **Priest Lake – Outlet Bay**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**

This water body is: **Unclassified**

Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info**: IDFG, and DEQ Coeur d'Alene Regional Office (CRO) evaluation**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988 Appendix A			**Partial Support (IDFG)**		**Not Supported (IDFG)**		
Appendix B			**Supported/ threatened (CRO)**		**Supported/ threatened (CRO)**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix D			**Partial Support**		**Not Supported**		

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause**: sediment**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment**

assessment info: **no water bodies assessed in 1996. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-6. Lower West Branch Priest River

ID-17010215-30 **Lower West Branch** upstream limit**: headwaters**

PNRS: **1411.00** downstream limit: **Lower Priest River**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**

This water body is: **Unclassified**

Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **assessed, but support status unknown**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988							

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix A			**Partial Support**		**Partial Support**		

1994 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info**: no water bodies assessed in 1994.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **none listed**

assessment info**: no water bodies assessed in 1996. 303(d) listing resulted from Idaho Panhandle National Forest analysis.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-7. East River

ID-17010215-03	**East River**	upstream limit**: headwaters**
	PNRS: **1415.00**	downstream limit: **Lower Priest River**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**	This water body is: **Unclassified**	Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **IDFG – evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988			**Partial Support**		**Not Supported**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix D			**Partial Support**		**Not Supported**		

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause**: sediment, DO, temperature, flow**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment, DO, temperature, flow**

assessment info: **no water bodies assessed in 1996. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-8. Binarch Creek

ID-17010215-26 — **Binarch Creek** — upstream limit**: headwaters**

PNRS: **1418.00** — downstream limit: **Lower Priest River**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**

This water body is: **Unclassified**

Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **IDFG – data evaluation**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988			**Partial Support**		**Partial Support**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix D			**Partial Support**		**Partial Support**		

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause**: sediment**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment**

assessment info: **no water bodies assessed in 1996. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-9. Reeder Creek

ID-17010215-23	**Reeder Creek**	upstream limit**: headwaters**
	PNRS: **1424.00**	downstream limit: **Priest Lake**

Current Classification in Idaho Water Quality Standards

map code: **map codes not available for unclassified water bodies**

This water body is: **Unclassified**

Designated Special Resource Water: IDAPA 16.01.02.95: **no**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**no**	**no**	**yes***	**no**	**no**	**yes***	**no**
	* denotes implicit designation through IDAPA 1601.02.101.01.a.						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info**: IDFG, and DEQ Coeur d'Alene Regional Office (CRO) evaluation**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988 Appendix A			**Partial Support (IDFG)**		**Not Supported (IDFG)**		
Appendix B			**Supported/ threatened (CRO)**		**Supported/ threatened (CRO)**		

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix D			**Partial Support**		**Not Supported**		

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause**: sediment**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment**

assessment info: **no water bodies assessed in 1996. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

Table A-10. Lower Priest River

ID-17010215-01 | **Lower Priest River** | upstream limit**: Upper West Branch Priest River**

PNRS: **1407.00** | downstream limit: **Pend Oreille River**

Current Classification in Idaho Water Quality Standards

map code: **PB-350P** | This water body is: **Classified** | Designated Special Resource Water: IDAPA 16.01.02.95: **yes**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
Designated Beneficial Uses for this water body:	**yes**	**yes**	**yes**	**no**	**yes***	**yes**	**yes**
	* protected for future use						

1988 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info**: DEQ Coeur d'Alene Regional Office – data evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1988 Appendix A	**Supported/ threatened**	**Full Support**	**Partial Support**		**Partial Support**	**Supported/ threatened**	**Supported/ threatened**
Appendix B	**Full Support**	**Full Support**	**Full Support**		**Full Support**	**Full Support**	**Full Support**

1992 §305(b) and §303(d) Information

§303(d) listed: **no**
cause:

assessment info: **evaluated**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1992 Appendix A	**Partial Support**	**Supported/ threatened**	**Partial Support**		**Partial Support**	**Supported/ threatened**	**Supported/ threatened**
Appendix D	**Supported/ threatened**	**Full Support**	**Partial Support**		**Partial Support**	**Supported/ threatened**	**Supported/ threatened**

1994 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause**: sediment**

assessment info**: no water bodies assessed in 1994. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1994							

1996 §305(b) and §303(d) Information

§303(d) listed: **yes**
cause: **sediment**

assessment info: **no water bodies assessed in 1996. 303(d) listing resulted from EPA analysis of 1992 305(b) report, Appendix D.**

Idaho's Beneficial Uses: IDAPA 16.01.02.100	Domestic Water Supply	Agricul. Water Supply	Cold Water Biota	Warm Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation
status assessment for 1996							

APPENDIX B

Significant Comments Received from Review of
Draft Priest River Subbasin Assessment and TMDL
and
DEQ Response to Comments Received

Table B-1. Significant Comments Received from Review of Draft Priest River Subbasin Assessment and TMDL, and DEQ Response to Comments Received

Acronyms used for commenting Agencies, Organizations, and Individuals

AWR =	Alliance for the Wild Rockies, The Lands Council, and Selkirk Priest Basin Association
BONN =	Bonner County
BRosen =	Mr. Barry Rosenberg
DHunt =	Mr. David Hunt, Chairman, Priest Lake Watershed Advisory Group
EPA =	U.S. Environmental Protection Agency
IDFG =	Idaho Department of Fish and Game
IDL =	Idaho Department of Lands
KEA =	Kootenai Environmental Alliance
KTOI =	Kalispel Tribe of Indians
* =	An asterisk at the end of an acronym signifies that the comment is similar to the one cited (without asterisk)

General Category of Comments Received, and Citation of Specific Comments within the Categories	Agency/ Organ.	DEQ Response to Comments
1. Dominance of brook trout in mid western and lower basin streams, and diminished populations of native cutthroat trout and bull trout:		The issue of population dominance of the introduced brook trout and decline of native cutthroat trout has been of significant debate. The §303(d) listed streams which are proposed for de-listing based in part on adequate population densities of brook trout are: Lamb Creek, upper Reeder Creek, and North Fork East River. A DEQ reply letter to EPA regarding this matter (Mabe 2001), states… "it is the goal of the Clean Water Act that water quality be adequate to support fisheries, however it can not be the goal of water quality management to always assure that fisheries management objectives are met. In the Priest River subbasin, our assessment is that the decline or depression in populations of native species may be only partially the result of changes in water quality, if at all. And it is not just a change in water quality we must look for, but a decline that has crossed a threshold to cause impairment. Fish managers introduced brook trout into the Priest River watershed during the early 1900s. Often these interlopers are better competitors than the natives are; to date few if any interlopers have been successfully extirpated. And there are other causes of species decline - migration barriers, direct habitat alteration - which are also concerns. These are certainly impairments of some sort, but are they water quality impairments? What seems clear is that they are not remedied by a pollutant load reduction that can be specified in a TMDL.
The discussion of factors and mechanisms for how land use practices affect native species is glossed over. University of Montana researchers (and others) have observed that brook trout may have a competitive advantage over bull trout in degraded habitats, and in particular increased fine sediment and loss of shade may favor exotic brook trout. Similar mechanisms have been suggested for the apparent ability of brook trout to replace westslope cutthroat trout in some streams. The presence of brook trout with few or no cutthroat or bull trout present, in a stream where they were historically present, is very possibly an indication that water quality has declined. We believe this is what has occurred on most west-side streams, where cutthroat are rare and bull trout are virtually non-existent.	IDFG EPA*	
There is considerable evidence to indicate that habitat and watershed disturbance in the Priest system has favored brook trout over native westslope cutthroat trout and bull trout. Where considerable road construction, agricultural use and/or timber harvest has occurred in tributary drainages with relatively low gradient stream reaches, brook trout are typically the predominant species. Because brook trout are more tolerant of higher water temperatures, and are capable of spawning in relatively sandy substrate provided there is some upwelling, they are persisting (and in some cases thriving) in conditions where native cutthroat trout and bull trout populations would be depressed or absent even if brook trout were not present in the system. We would expect to see healthy resident cutthroat populations in the tributaries where habitat conditions are good.	IDFG	
IDEQ has decided that sustaining populations of the non-native and invasive brook trout constitutes support of the beneficial uses cold-water biota and salmonid spawning. These decisions are of deep concern to us. The threat of brook trout to bull trout and cutthroat trout is widely documented. Your agency has an opportunity to work collaboratively with other agencies toward recovery of native species and native habitats and we encourage you to do so. Efforts consistent with this management strategy would be to defer de-listing tributaries currently not supporting cold-water biota and salmonid spawning until these uses are met by native species. We do not support IDEQ's decisions to de-list tributaries based on presence of brook trout indicating that cold-water biota and salmonid spawning beneficial uses are met. The Kalispel Tribe does not consider the presence of healthy brook trout populations, and no other salmonid populations, to be an indicator of support of cold water biota and salmonid spawning.	KTOI	

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
Comment 1 continued: native salmonids		**DEQ reply letter to EPA (Mabe 2001) continued:**
We do not agree that sustaining populations of non-native, invasive brook trout constitutes support of the beneficial uses. We contend that the responsibility for TMDL development clearly includes (and the Clean Water Act requires) restoration and/or maintenance of native fish populations. The threat of brook trout to bull trout and westslope cutthroat trout is widely documented, therefore their presence is indicative of impaired CWB and SS, not full support. The presence of large numbers of non-native brook trout in upper Reeder Creek are indicative of serious problems.	AWR DHunt* BRosen*	While we support IDFG's new fisheries management goal of restoring native species, we can not automatically conclude that our aquatic life use is not met were resident salmonids are self-sustaining. We suspect it is going to take more than TMDLs, even more than water quality improvements, to meet these new goals. In the Priest River watershed IDFG has asserted that cutthroat and bull trout are less tolerant of elevated levels of sediment, and "believe" this has driven these species out of most west-side streams. Their comments to us speak of "considerable evidence", but they have not provided DEQ nor EPA with any evidence to substantiate the claim. This evidence would have to support a lower target for sediment loading that would (presently is) supporting brook trout. With such evidence we might be able to craft a TMDL for sediment on the basis of impairment to cold water aquatic life."
IDL recognizes that some agency research demonstrates that introduced brook trout may be more tolerant of increased sediment and temperature extremes. We agree that brook trout do have the ability to infringe upon and populate the range of suitable habitat conditions for both bull trout and cutthroat trout. However, there are examples where brook trout have successfully established thriving populations in pristine, undisturbed habitats. Therefore, we do not feel that the presence of brook trout in a waterbody necessarily indicates impaired water quality.	IDL	
2. Lamb Creek should not be de-listed because of high current sediment loading, and lack of native salmonids.		
Lamb Creek should not be de-listed. The stream is laden with sediment, and the Forest Service is currently carrying on extensive clear-cut logging in the drainage for the Douglas fir beetle timber sale that will increase sediment load. Lamb Creek is also being impacted by grazing on Forest Service and private lands.	BRosen	Road density statistics for Lamb Creek are on the upper end for Priest River basin watersheds, and the sediment load calculations of Section 4 estimate a current sediment load of 218% above natural background levels.
The SBA data for Lamb Creek does not support IDEQ's recommendation to de-list Lamb Creek for sediment. The USFS characterization of Lamb Creek is Not Properly Functioning and Functioning at Risk; there is a high road density of 6.2 mi/mi^2; and the are 52 stream crossings over 31 miles of perennial streams.	KTOI AWR* DHunt*	However, the instream bioassessments measured within Lamb Creek do meet DEQ criteria for cold water biota and salmonid spawning beneficial uses: average MBI = 3.7
Our agency continues to be very concerned about the criteria being used for de-listing, and that some streams which in fact are impaired, such as Lamb Creek, will be de-listed with no effort to improve conditions. Our preference is to see impaired streams remain on the list, and to have TMDLs established which reasonably, fairly, and equitably distribute the responsibility of water quality improvement, using methods which are adequate to get the job done while minimizing impacts on affected parties. We encourage review of the criteria to ensure that impaired streams are not removed from the list.	IDFG	average total salmonid density = 0.6 salmonids/m^2/hr effort 4 salmonid age classes including juveniles (<100 mm) [density and age classes were brook trout] abundant sculpin density in the lower reach sampling area.

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
3. Draft recommendation to de-list Kalispell Creek and Binarch Creek because of current, low - moderate sediment load calculations.		
The fact that excess sediment delivery may be the result of past land use more so than current use does not eliminate the need to address it in a TMDL. Does USFS have monitoring data indicating that the sediment sources in the Kalispell Creek watershed that have been fixed, are no longer contributing sediment to the system? The relocation of Road 308 is not guaranteed. Kalispell Creek should not be de-listed, and it should have a TMDL. For Binarch Creek, excessive sediment is clearly affecting the fish, hence the need for a TMDL.	AWR BRosen* DHunt* IDFG* KTOI*	The Priest Lake Watershed Advisory Group (WAG) in their review of the SBA and TMDL, recommended that any §303(d) listed stream judged as Not Full Support should not be de-listed, regardless of the results of sediment calculations. Kalispell Creek remains on the list and a TMDL has been prepared. For the same reason stated above, the Priest Lake WAG recommended not to de-list Binarch Creek. However, for this stream the NFS status was in large part based on a single electro-fishing survey. The WAG stated that this was insufficient data to make a confident status call. The WAG agreed with DEQ that a status call for Binarch Creek will be deferred until a more thorough fish population survey is conducted during the summer of 2001 within the Binarch Creek Research Natural Area.
Although there is conflicting information, it would appear that Binarch Creek does not fully support its uses, and should not be de-listed. We recommend retaining this water on the 303(d0 list and writing a sediment TMDL, or revising the TMDL schedule and collecting additional information to better assess beneficial use support status.	EPA	
Binarch Creek should also not be de-listed. The USFS project files for the Douglas-fir beetle (DFB) project indicate that: the B channel reaches have extremely poor pool habitat due to the aggradation of sediment; the DFB timber sales will increase peak flows; the DFB project proposes to obliterate only 0.5 miles of road out of the 50 miles of road currently in the drainage; and there has been considerable timber harvesting over the past 25 years. The impacts of the DFB timber sale should be quantitatively assessed before this stream is considered for de-listing, and it would be foolish to jeopardize a genetically pure population of westslope cutthroat trout.	BRosen	
4. Proposed §303(d) de-listing of Trapper Creek, Two Mouth Creek, and Tango Creek.		
IDL strongly supports the proposed de-listing of Trapper Creek and Two Mouth Creek. All collected data indicates that these streams are in full support of beneficial uses according to established criteria.	IDL	As detailed in Section 3 of this report, these three streams clearly meet the DEQ Full Support criteria for cold water biota and salmonid spawning. Native cutthroat trout are present in the electro-fishing surveys, and bull trout have been captured within Trapper Creek and Two Mouth Creek.
The de-listing decisions for Trapper, Two Mouth and Tango Creeks should be re-visited in light of current levels of sediment and non-native species. One logical option would be to defer de-listing tributaries currently not supporting native species based on temperature criteria or other data, until these are met.	AWR KTOI*	
The SBA cites an IDL report as saying that the Trapper Creek bull trout population is stable. We disagree with that statement. Our data indicate a small and "at risk" bull trout population.	IDFG	
5. Fish habitat was not sufficiently taken into consideration for judgement of beneficial use status.		BURP habitat scores, HIs, were used only to a minor extent in beneficial use status calls for Priest River basin. It has been DEQ policy as stated in the Water Body Assessment Guidance documents, to rely heavily upon bioassessment protocols. It is believed that many habitat measurements are subjective, and lack repeatability among stream survey crews.
Fish habitat, including stream temperatures, pool quantity and quality, and spawning habitat should be evaluated against qualities that provide good native fish habitat and not be compared with basin wide averages. Especially since the drainages in the Priest River basin are, for the most part, severely degraded.	BRosen	

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
6. Proposed §303(d) de-listing of Middle Fork and North Fork East River.		
The data collected and analyzed for the Middle Fork and North Fork East River, including: BURP, channel stability, cumulative effects analysis and fish density surveys, clearly indicate that these streams are currently in full support of designated beneficial uses. There appears to be no actual water quality data presented that indicates beneficial uses are suppressed; thus, an Advisory Sediment TMDL is not warranted. In fact, the East River Forks are supporting some of the highest densities of cutthroat in the Priest River subbasin. In addition, the Middle Fork is the only subwatershed in the lower basin that supports a bull trout population. It has been well documented that bull trout are highly sensitive to both temperature and sediment, yet they continue to exist in the Middle Fork, indicating that stream temperatures and instream sediment levels are low and water quality is more than adequate to support bull trout.	IDL	Instream bioassessments of Middle Fork East River clearly meet DEQ criteria for CWB and SS beneficial uses. EPA has agreed with this assessment. Measures of Full Support were: average MBI = 4.3 average total salmonid density = 0.07 salmonids/m^2/hr effort for BURP, but IDFG & IDL electro-fishing results were 11 salmonids/100 m^2 with abundant cutthroat in mid to upper reaches. 4 salmonid age classes including juveniles (brook trout). abundant sculpin density in both lower and middle sampling reaches. Instream bioassessments within North Fork East River were less clearly FS, but data did meet measures of FS: average MBI = 4.3 average total salmonid density = 0.2 salmonids/m^2/hr effort for BURP, and IDFG electro-fishing results were 6 salmonids/100 m^2 with cutthroat in upper reaches. 2 salmonid age classes including juveniles (brook trout), but SS = FS under WBAG criteria with HI > 73. presence of sculpins
Much of the available information points to the need for a mandatory TMDL for the Middle and North Forks of East River. These major tributaries appear to suffer from poor to mediocre habitat conditions and low densities of cutthroat. The lower reaches of the two Forks and the main stem suffer from the "cumulative effects of excessive sediment, hydrologic disequilibrium, historic riparian harvests, and possibly elevated temperatures" (SBA at 114). The Middle Fork does not meet the minimum target levels of 0.1 – 0.2 fish/m^2/hr effort.	AWR	
The North Fork East River should not be de-listed because it has no native cutthroat trout, and a very low non-native brook trout population. The Middle Fork should not be de-listed to protect the dwindling and threatened bull trout and cutthroat trout.	DHunt	
Referring to the East River as a last stronghold for bull trout is probably an over statement. Based on our data and more recent observations by IDL, bull trout in the East River are in a remnant status.	IDFG EPA*	
The East River is listed for DO, flow, temperature and sediment on the 1998 303(d) list. We assume that DO will remain on the list until measurements are obtained.	EPA	
7. Main Stem East River		
The limited water quality data that was collected in the lower main stem East River does identify serious long term direct impacts to the stream and surrounding riparian area. The conversion of riparian wetlands, beaver ponds, and cedar/hemlock habitats to pasture and agriculture has permanently removed LOD and future recruitment. This conversion to pastureland has allowed for accelerated stream bank erosion, reducing long-term bank stability, reducing streamside shade, and reducing favorable fish habitat. We believe the accelerated bank erosion and high percentage of unstable banks is a reflection of the direct impacts associated with the adjacent land use activities, and not an undocumented water yield or sediment problem.	IDL	It is acknowledged that the main stem East River has had accelerated stream bank erosion and a high percentage of unstable banks due in part to a history of large animal access. The CWE Hydrologic Risk Rating for Middle Fork East River also suggests a risk to stream bank erosion from increased peak flows. A beneficial use status call for the main stem is proposed for deferral until a current fish survey is conducted during the summer of 2001.
The main stem East River should not be de-listed because it has severe cattle damage, and severe dissolved oxygen, sediment and temperature problems. Also, a current fish survey has not been conducted on this section.	DHunt	

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
8. Priest River basin streams that are not on the §303(d) list, and appear to be Not Full Support based on the BURP and other data.		
According to Table 2-13 several of the Non-listed (NL) streams have high road densities, and a high frequency of stream crossings. Other information in the SBA indicates that beneficial uses are likely not fully supported in many of the NL streams. Soldier Creek is a prime example. The BURP habitat score was very poor in the lower reach, 75% of the watershed has been logged, the headwaters have been burned, and the timber road density and riparian road density is extremely high. Soldier Creek is also considered as likely to support bull trout spawning and rearing. This is obviously a watershed in need of restoration efforts that could benefit from a TMDL.	AWR EPA* KTOI*	All non-listed stream segments presented in Section 3.5 of this report will be evaluated for beneficial use status for the DEQ 2002 §303(d) list. The Coeur d'Alene Regional Office will accomplish this evaluation by December 2001. It is anticipated that the mechanism for making status calls will be the Water Body Assessment Guidance, Second Edition (WBAGII). This guidance document is currently in draft format and undergoing peer review and a public comment period.
The draft Priest River SBA and TMDL provides a cursory description of the streams that have not yet been assigned WQLS status. The Upper West Branch and its tributary Goose Creek is a good example of this type of cursory description. The UWB is extremely degraded, and Goose Creek, its main tributary, is probably one of the most degraded streams in the Priest lake area.	BRosen EPA*	
Should Caribou Creek be categorized as Not Full Support and put on the 303(d) list? The electro-fishing results do not meet the criteria you suggest for being Full Support of cold water biota on page 169.	EPA	
9. Exceedances of various water temperature criteria, and deferral of §303(d) listing decisions based on temperature exceedance.		
The SBA concentrates on sediment loads and defers all decisions concerning temperature pending resolution of DEQ re-evaluation of various temperature criteria and negotiations with EPA. We encourage you to consider effects of land use on temperature when making decisions concerning sediment loads. Many of the land use practices affecting sediment delivery to streams also affect stream temperatures. A prudent approach involves mandating or recommending management practices to address multiple parameters. It is inappropriate to delay judgment on temperature exceedances given the irrefutable data showing high temperatures. Again, we encourage IDEQ to take the opportunity to manage for multiple water quality parameters when drafting subbasin assessments and total maximum daily loads.	KTOI	The final version of this SBA and TMDL continues with the deferral of §303(d) listing decisions for streams that exceed current temperature criteria. In the Priest River basin it appears that all main stem stream segments, from lower to middle reaches, exceed the State cutthroat spawning and incubation criteria during July, and where applicable, the EPA bull trout criteria from July - September. Temperature exceedance judgements will defer until the mentioned negotiations with DEQ and EPA are complete, along with forthcoming guidance received from the Northwest Regional Temperature Criteria Development Team. For the two watersheds that will be going forth with a sediment TMDL, Lower West Branch and Kalispell Creek, development of the TMDL Implementation Plans can certainly incorporate measures to help mitigate elevated water temperature.

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
10. Inclusion of Advisory TMDL for East River and Lamb Creek		
It is not clear what is meant by the term "Advisory TMDL". Does "advisory" mean that load calculations are advised, but won't be required? We would recommend that you not use this term and simply call the water quality plans TMDLs.	EPA	The draft SBA and TMDL included Advisory TMDLs for the Lamb Creek and East River watersheds, two stream systems where Full Support of beneficial uses were determined (excluding the main stem East River). These TMDLs were meant as resource information, to the Priest Lake WAG and others, as a means to present calculation results for sediment yield and load allocations for two watersheds that did show moderate - high current sediment load over background. The concept of an Advisory TMDL caused confusion, and they have been eliminated from the final report.
11. Appropriate Measures of Full Beneficial Use Support as part of a TMDL.		
The trout density level criteria (0.1 - 0.2 fish/m^2/hr) is based on "reference" streams within the NF Coeur d'Alene drainage. In comments on the draft SBA we expressed concern regarding the criteria used to select the reference streams on which it is based. This SBA indicates that appropriate reference streams for the mid and lower western Priest Basin streams unfortunately do not exist.	AWR	The target density criteria of 0.1 - 0.2 total trout/m^2/hr effort for the North Fork Coeur d'Alene River, was in part established from data supplied for the upper Priest River basin streams, Trapper Creek and Two Mouth Creek. Data collected within the Priest River basin shows that the target density above is approximately equivalent to the range of 5 – 10 total trout/100 m^2.
As we have repeatedly pointed out in previous comments on the adequacy of the WBAG process, the Full Support criteria for salmonid spawning is inadequate, and its use as a criteria for determining FS for SS is arbitrary.	AWR	While the Trapper Creek and Two Mouth Creek watersheds have had a history of timber harvesting and road building, they are clearly Full Support, and are considered potential candidates as reference streams. Other candidate reference streams reside in the Hughes Fork and Upper Priest River watersheds, where densities are most commonly in the range of 5 - 10 total trout/100 m^2; although in a few tributary streams densities ranged 20 - 30 total trout/100 m^2.
The use of sculpin for determining whether excess fine sediment is a problem cannot be applied in the Priest Basin since high numbers of sculpin were found in lower Lamb Creek which has a high sand component.	AWR	The presence of sculpins within electro-fishing surveys has become incorporated into the DEQ indicator metrics for cold – clean water in the draft WBAGII methods. The primary sculpin species in the Priest River basin, slimy sculpin, can apparently thrive within large grained sandy substrate of lower stream reaches, e.g. lower segments of Lamb, Kalispell, Quartz, and Big Creeks; but are absent in reaches of more silty substrate, e.g. mid Reeder Creek, Lower West Branch, and Binarch Creek.

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
12. Methods used for sediment load calculations; use of WATSED model in sediment calculations; and the establishment of a loading capacity 100% above natural background.		
It appears that most assumptions used to calculate sediment load tend to underestimate the load. Just using CWE for road sediment likely underestimates the load significantly as you point out with your example of a modeling method that estimates more than twice the CWE load calculated. From the partial road CWE inventories, you do not prorate the entire road network in the watershed for either road failures at stream crossings or for failures at other than stream crossings. Landslides are not included in the calculations at all. You do include the total road network mileage in sediment yield calculations, specifically to offset the underestimate of not including forest activities in the forested land calculations. However, there is no discussion of why you would expect that these assumptions would approximately cancel each other out in terms of load volume. It is necessary to apply conservative assumptions to deal with this uncertainty.	EPA	The TMDL discussion of Section 4 fully acknowledges the inherent high error of predicting sediment yield to streams using the methods presented. **The approach taken was more geared to estimate the relative, current sediment increase over background which could be comparable among the mid to lower basin watersheds that were analyzed**. Producing sediment yield values to streams with less error would take far more detailed in-the-field assessments for each watershed than currently exists. This report has recommended that increased field assessments and validation of sediment calculation methods be incorporated into the TMDL Implementation Plan.
EPA has a number of concerns with IDEQ's proposed approach for using the results of WATSED for setting TMDL targets and annual sediment levels, which fully support beneficial uses. EPA does not believe the use of 100% above background as a sediment target is justified based on information presented in the Lower West Branch TMDL. Concerns with WATSED and a 100% loading capacity are as follows: - WATSED is a model most used to provide useful information to identify sources of sediment and compare management alternatives, not to predict specific quantities of sediment yielded and to base significant decisions, - model extrapolation outside the Idaho Batholith should be done with caution, - there is insufficient model validation and calibration in northern Idaho Forests, - at best the certainty of annual load predictions is +/- 50% to 70% where there is good information on critical parameters, particularly road mileage and maintenance information. Unless the model is calibrated and validated, the accuracy of sediment estimates from differing geology's and landforms is unknown.	EPA	There seems to be a misconception that the sediment calculation method is from a WATSED computer run. This is not correct. WATSED landtype sediment yield coefficients were used for the entire estimate of background sediment yield (with assumed 100% delivery to streams), and the forested acreage of current sediment load (minus the acreage of the road system and land converted to agriculture). The WATSED landtype coefficients take into account erosional characteristics of the varying parent geology, soils, and hydrology, such as differences between granitic and belt geology. While not calibrated to the degree of BOISED in the Boise National Forest, there have been some in-field assessments of sediment yield from different WATSED landtypes in northern Idaho forests. WATSED coefficients were determined to be the best available method at hand for northern Idaho TMDLs. Section 4.1.3 clearly describes the other sediment yield methods and calculations to develop current sediment yield estimates other than WATSED for forested land. State wide, DEQ TMDLs have adopted the IDL – CWE inventory protocol and conversion of road CWE scores to sediment delivery to streams. While appearing to underestimate sediment yield compared to more site-specific methods cited in Section 4, the CWE inventory and scoring protocol provides a time efficient method to cover many hundreds of road miles that must be addressed in a 4th order HUC SBA and TMDL.
One approach recommended by EPA is to set the target of the TMDL at the natural level of sediment production. We agree with IDEQ's explanation that beneficial uses would be fully supported at some yet undefined level above natural background even though it is beyond current available predictive tools to identify what that level above background is.	EPA	
To establish a loading capacity other than natural background level would require a sediment calculation method more robust than presented in the draft SBA and TMDL.	EPA	

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
Comment 12 continued: methods of sediment calculation.		**DEQ response continued:**
Any model used in the "credit" process, such as the Forest Service's WATSED model, should be validated and a report of the validation process should be available to the public. To date, the INPF has not validated the WATSED model. Monitoring is the key.	BRosen	As described in Section 4.1.3, an attempt to offset the apparent underestimation of CWE, and by not accounting for timber harvesting activities other than road building (skid trails for example), was to apply CWE sediment delivery to the entire road network mileage. This method was used throughout all watersheds analyzed for the sake of consistency. EPA's comment is correct in that there is no estimate attempted on the degree in which the sediment calculation for the entire road system may offset that lack of sediment yield from other timber activities.
The WATSED model does not account for rain-on-snow events. The Final Assessment should indicate: the date of the most recent calibration and verification of the model; the watersheds on the Priest Lake R.D. where the calibration and verification occurred; and indicate if any 1st, 2nd, or 3rd order watersheds were included during the calibration and verification process of WATSED by the Forest Service.	KEA	The EPA comment on not prorating road mass failures to the entire road network is only correct for sediment calculations of the East River drainage. On all west side watersheds of USFS management, total slides and stream crossing washouts per year were based on USFS road maintenance experiences and considered the entire road network. Landslide sediment delivery was included on the road prism. An estimate of landslides occurring on non-roaded forested land was not included. From aerial photographs, these appear to be minor.
We find the rationale for the decision to use 100% above estimated natural background levels to be somewhat inscrutable. We do not find that the data sets presented (calculated current sediment load) indicate conclusively that 100% above background is a suitable threshold for loading capacity/TMDL purposes.	KEA	The concept of establishing loading capacity at 100% above background for the Lower West Branch TMDL and 50% above background for the Kalispell Creek TMDL was fully explored in Section 4.2.2. It remains the contention of DEQ that watersheds throughout the Priest River basin exhibit Full Support for cold water biota and salmonid spawning beneficial uses with historical land use activities and sediment delivery to streams beyond the natural background level. Establishing loading capacity at background level discounts this known fact, and it is not a feasible or realistic target from an economical and societal standpoint. By agreement with EPA, the loading capacity for Lower West Branch has been lowered to 50% above background for this final TMDL.
The sediment calculation method identifies relative sediment delivery rates rather than actual rates. The Middle Fork and North Fork East River were modeled to have 145% and 128% increase of current sediment load over background, yet these streams have some of the lowest percentages of measured fine sediment in the entire Priest River basin, ranging from 11 to 35 %. In contrast, streams such as Binarch and Kalispell have been modeled to have 73% and 84% increase sediment over background, yet the percent fine sediment in both these drainages ranges from 24 – 100%.	IDL	Several comments refer to the lack of calibration and validation of the sediment load calculations specifically within 5th and 6th order watersheds of the Priest River basin. DEQ agrees with these comments. The task of BURP sampling and the Water Body Assessment Guidance is to determine which of the watershed streams in a large 4th HUC such as Priest River basin are truly water quality impaired (Not Full Support), and which streams are fully supporting their beneficial uses. The results of this task have been documented within this Subbasin Assessment. As the scope of this task and acreage involved narrows by identifying impaired streams, a focus can change to more accurately and thoroughly developing sediment sources and amounts yielded. DEQ would expect that within TMDL identified watersheds, in-the-field assessments leading to calibration of sediment yield calculations would be incorporated into development of the TMDL Implementation Plan.
The calculation method is based on perceived assumptions and modeled coefficients that have insufficient validation, and the modeled sediment load calculations are not reflected in the water quality sediment monitoring data.	IDL	

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
13. The effect and relationship of roads and clear-cut harvests on: peak flows; sediment from rain-on-snow events; stream bank erosion; and fisheries habitat degradation.		
[Editors note: in their comment package, the Kootenai Environmental Alliance cites several pages of peak high flow statistics from the USGS gauging stations on Lower Priest River and other gauging stations from the Priest Lake baseline study. Also cited are numerous statistics of clear-cut harvests in the basin, and studies in other northern Idaho National Forests on the relationship of clear-cut harvests and peak rain-on-snow events. These statistics are not repeated here. Below are the main points stated regarding these statistics:]		The comment package from KEA was difficult to decipher for main points because of the numerous flow data cited which for some reason included cfs conversions to gallons. The pages of data were prefaced by stating that, "the following information seems to indicate that flow alterations in the watersheds have caused streambed instability and extensive coarse bedload movement in streams." I could not come up with that conclusion based on the data supplied. The Priest River Subbasin Assessment did provide: all flow data where known; maps and data of canopy removal indexes from CWE aerial photography interpretation, and historical clear-cut acreages from the USFS; the calculated CWE Hydrological Risk Ratings; instream BURP habitat data and other collected habit data such as width/depth ratio, pool frequency, and residual pool volume; stream bank erosion data; and USFS analysis of watershed disequilibrium in the way of "Functioning Condition." Also mentioned was construction by USFS of structures to create pools in Kalispell Creek, and then subsequent pool filling by moving sand bedload. This author contests the comments by KEA that water flow, clear-cut harvest acreage, and other data and information was withheld from the public in this SBA. It is agreed that an analysis of the relationship between canopy removal and road construction with peak flows and instream habitat conditions was not as fully explored as what would be desired by KEA and others. Degradation of habitat linked to watershed activities was though considered in the judgement of Lower West Branch as water quality impaired. Again, the approach taken by DEQ for beneficial use status does heavily rely on the instream bioassessment measurements. It would be assumed that TMDL implementation efforts for sediment reduction will lead to a degree of improvement in channel disequilibrium linked to accelerated peak flows.
Information presented in our comments seems to indicate that flow alterations in the watersheds have caused streambed instability and extensive coarse bedload movement in streams and creeks in the Priest River subbasin. This has resulted in degradation to fisheries habitat, which includes the filling of pools, a loss of pool complexity and a reduction of pool frequency.	KEA	
The large amount of water that was moving in the 902 sq mile area on the days cited, together with the associated stream power would be expected to have moved significant amounts of coarse bedload in a number of streams and creeks in watersheds within the drainage. The clear-cut units in the watersheds that are less than 40 years old have not recovered hydrologically, according to the information supplied.	KEA	
The Final Assessment report should supply data that would inform the public as to the number of acres that have been clear-cut since 1960 in the watersheds on the Priest Lake Ranger District.	KEA	
The Final Assessment should also supply data for the number of acres of State Forest lands that have been clear-cut since 1960 in the watersheds that are within the Subbasin Assessment boundary. Cites that the CWE HRR for Middle Fork East River may indicate stream channel impairment due to increases in peak flow discharge and sediment delivery. The Final Assessment should indicate to the public whether there is any long term historical data regarding actual or estimated annual flow volumes from the East River watershed.	KEA	
Final Assessment should indicate if historical cfs flow volume exists for all other east side streams, and if WY 95 peak flows for each watershed are considered as normal. Final Assessment should indicate if historical cfs flow volume data for all watersheds would show high peak flows occurring in these watersheds before there were logging activities.	KEA	
It is expected that rain-on-snow events will continue to occur in the Subbasin Assessment area, and that high cfs flows will continue to occur. If the proposed TMDLs do not reduce the high cfs flows and movement of course bedload continues, will important fisheries and habitat be protected and improved with the proposed TMDLs? The Final Assessment should supply analysis of the expected impacts to fisheries habitat in the streams if high cfs flows continue to occur after TMDL sediment reduction actions.	KEA	

Table B-1. Continued

General Category of Comments Received, and Content of Specific Comments	Agency/ Organ.	DEQ Response to Comments
Comment 13 continued: the effect and relationship of roads and clear-cut harvests on: peak flows; sediment from rain-on-snow events; stream bank erosion; and fisheries habitat degradation.		
Page 59 mentions instream fish habitat structures constructed by USFS. Final Assessment should indicate if there is USFS survey information concerning the number of structures that have been damaged or removed in one or more streams after high peak flows and/or rain-on-snow events.	KEA	
Closer attention should be paid to the relationship of in-channel and stream bank erosion resulting from logging, especially when employing the "credit" scheme. Site-specific monitoring should be employed to determine the relationship between peak flows generated by roads, and clear-cut logging, and in-channel and stream bank erosion. The risk of massive inputs of sediment from rain-on-snow events should also be given more consideration.	BRosen	As TMDL watersheds go into the implementation phase, it would be anticipated that a greater degree of site-specific analysis of sediment yield and monitoring would be incorporated. This must be done to achieve a level of cost effective measures for sediment reduction.
14. Habitat and flow alterations as pollutants of concern under the Clean Water Act.		
KEA disputes that habitat and flow alterations are not pollutants under Section 303(d) of the CWA. Habitat and flow alterations that have negatively affected bull trout and westslope cutthroat populations and fisheries habitat in the Basin fall under the fisheries requirements of the CWA in our opinion. There are no Federal Court rulings that we are aware of that have stated the establishment of TMDLs supersedes the requirements of the CWA.	KEA	
15. Inequity of sediment load allocation to Bonner County for Lower West Branch TMDL.		
From your analysis, the County maintains around 0.3% of the land in the Lower West Branch watershed. In addition, the county roadways only contribute 3.6% of the total sediment load. However, in your scenario, the County would be required to provide 8.4% of the TMDL reduction, or 28 times our land allocation. I believe this puts too high a burden on the County. I believe there must be a more equitable way to allocate. All of the land maintained by the county is roadway, while a small percentage of land held publicly or privately is roadway. Certainly, dirt or gravel roadways produce more sediment than forested land. So it follows that the state, USFS and private holdings benefit from the portions of their land that are not roadway. Further, not only does everyone that uses the private, USFS or state lands benefit from the use of the county roadways, those roadways are only there to serve those stakeholders. Therefore, I propose the sediment reduction allocation assigned to the county be reduced to a figure between the 0.3% of land holdings and the 3.6% of the calculated current sediment load. Further, the sedimentation numbers attributed to the County road may need to be adjusted. In your explanation, it is stated that the county cleans the ditches each year. Though we have been cleaning the ditches the past two years as a part of a road building project, generally we clean the ditches when necessary or about once every 5 - 10 years.	BONN	The methods of sediment load calculation for county roads, and the reasons that an inequity developed between land ownership percentage and load allocation, are explored in Section 4.3.1.8, the TMDL for Lower West Branch. A primary reason as stated by the County comments is that 100% of land assigned to county maintenance is a road system. During the development phase of the TMDL Implementation Plan, DEQ has recommended that a more equitable allocation for County roads be made. It would be anticipated that Bonner County would be a member of a local Watershed Advisory Group for the Lower West Branch TMDL, and thus would be a part of the planning team.